THE

SOUTHERN AGRICULTURIST.

FEBRUARY, 1830.

PART I.

ORIGINAL CORRESPONDENCE.

ART. I.—*On the Causes which produce the Second Growth of Sea Island Cotton; by the* Hon. WHITEMARSH B. SEABROOK.

[Addressed to the St. Andrew's Agricultural Society, and furnished by it for publication in the Southern Agriculturist.]

Gentlemen,—Within a few years, the attention of the planters of South-Carolina, has been very advisedly directed to the best mode of fertilizing exhausted soils. Urged in part by necessity, and in a considerable degree influenced by the animating spirit of our agricultural associations, they now practically subscribe to the principle, that the earth, like man, it is necessary to support and invigorate with appropriate aliment. The application of manures, however, is a subject very distinct from that of their composition, their relative value, and durability. Whilst the latter topic has engaged of late, almost exclusively, our thoughts, the former it would seem, is scarcely worthy of a passing notice. Unaided by reflection, food of any kind is spread at random, over land variant in its general properties. By this means, the hopes of many industrious, but indiscreet planters, are annually blasted—in a week, the labour of months is not unfrequently sacrificed. Among the evils commonly resulting from the practice adverted to, in relation to cotton, is the new, or second growth of that plant.

Unless this occurs at an early period of the season, the crop is invariably unproductive. On this subject, allow me to offer to your consideration, a few cursory remarks:

1. The usual manner of applying manure, is to spread it in a narrow line, directly in the centre of the alley. As soon as the tap-root meets with it, the plant becomes strongly excited, and a rapid growth ensues, if no unfavourable circumstance intervene. Should a drought succeed, the effect of the manure is to generate a scalding heat, which by operating injuriously on the main root of the cotton, is apt, collaterally, to arrest its nutritive functions. This is particularly true, where the soil is not very retentive of moisture. The first shower of rain that falls, if it descend below the list, gives a fresh impulse to the manure. The cotton revives—new shoots are quickly sent forth, and obedient to the law which governs the vegetable, as well as the animal kingdom, the juices of the plants, by a chemical process, are so changed, as to be rendered unfit for the nourishment of the fruit. Every pod, therefore, not of a mature age, disappears, and an assemblage of valueless stalks, alone, greets the astonished planter. What is the remedy for this disease? I answer, the introduction of the system of broad-casting manure. Although where beds or ridges are necessary, this scheme cannot be perfectly executed, yet it may be done in a manner highly satisfactory If, for example, it is proposed to sow one or more bushels to the row, of any pulverized substance, let it be scattered along the alley, as over the whole of the bed. If the land is carefully listed, the manure will thereby be sufficiently, well incorporated with the soil, and every part of the list will contain a portion of it. In this way, the various roots of the cotton will be stimulated gradually, and alike; and the tap-root, by its non-liability, under these circumstances, to be gorged with food, will seldom be improperly excited. As an excess of nutriment is detrimental to the bearing of the cotton plant, common sense and analogy should teach us, that the substances intended to aid it, should be so mixed with the earth, as that it may be regularly, equally, and otherwise advantageously supported by them. As a practical confirmation of this plain principle, I would recur to the fact, that cotton, on land, where a cow pen had been passed over, (which is but another manner of broad-casting,) is almost invariably better than that portion

of the crop contiguous to it, under the operation of the common mode of manuring. The practice, however, of having moveable cattle pens, with a view to enrich the soil, is injudicious, from the very limited quantity of ground which can thus be meliorated. It is, nevertheless, a certain way, so far as it can be adopted, of ensuring a crop of cotton, potatoes, or corn, provided, in relation to the two former, that the pen is frequently removed.*

2. Early planting is another cause of new growth. Cotton of an ordinary season, will grow a definite time. The usual period of its maturity is early in September, or about five months after the sowing of the seed. Should it be planted unusually soon, it will ripen about the middle of August, when the weather is variable, and we are liable to be visited by sudden and heavy showers of rain. From whatever cause it may arise, if the plants attain their full growth in August, especially in the commencement of that month, the eventual productiveness of the crop will depend mainly on the regularity of the season; for, should a renewed action be imparted to the manure, the prematurity of the plants will make them peculiarly susceptible of being affected by the slightest deviation from those circumstances which tended to perfect them. I am satisfied that the proper seed time for cotton is between the 5th and 15th of April. It will then mature about the period when the general decay of vegetation begins to be visible.

3. Enclosing and late listings, are two other causes to which I would now advert. Solid substances, it is well known, cannot pass into the organs of plants, except in a state of solution. It is also known, that "vegetable manures, in general, contain a great excess of fibrous and insoluble matter, which must undergo chemical changes before they can become the food of plants." If the mass of vegetable matter, which usually distinguishes an enclosed field, is buried in the beginning of winter, it will then afford food capable of being consumed during the process of vegetation. But if, as is too frequently the case, the listing is immediately previous to the planting of the crop, the tap-root soon becomes incased in a body of dry, woody matter, not then concocted. This cause impedes its descent, and the want of earth prevents it

* A pen, the one-fourth of an acre square, on which about one hundred head of cattle is nightly enclosed, should be removed every third day.

from imbibing its necessary supply of nourishment. The plants therefore wither, or if the season be rainy, they grow without putting out fruit. As soon, however, as the vegetable matter has been resolved into new elements, the cotton invigorated by its influence, assumes a dark green appearance, indicative of the activity of the vital principle. This state of things endures until, from the want of moisture, the manure ceases its direct agency. The crop then will be precisely in that condition in which it is most readily affected, by any change of the weather. To list late, especially an enclosed field, is not only to invite a second growth, but to ensure the want of fruit on the lower branches. Should the planter have been unable to prepare his land early, I would advise, in that event, that the cotton be planted on the *sides* of the beds, so that the tap-root may pass *by*, and not *through* the body of sward, which constitutes the list. In the formation of a bed for that purpose, nothing more is necessary than that it be large, broader than usual, and that the dirt be thrown rather abundantly on the side intended for the seed. The most perfect and healthy cotton I remember ever to have seen, was where this plan was adopted.

4. The last cause of new growth in cotton, to which I would ask your notice, is, late hoeings, or whatever deranges the vegetable functions, particularly when the crop is in full vigour. In July, there lie near the surface of the ground, an immense number of minute, thread-like substances, issuing from the lateral roots, which exercise an important part, as the organs of nutriment. The cutting or breaking of these, by the hoe, or wind, creates disease, and as their office is indispensable to the cotton, nature empowers it to furnish a new supply, in effecting which, the whole plant undergoes a change, more or less injurious, as the season is wet or dry. The sudden disappearance of the fruit is the first intimation which the planter receives of his imprudence and unskilfulness. Then a remedy is beyond his reach. A rapid growth, however, or one of very long continuance, does not usually result from the cause just alluded to; but it is seldom less than to produce consequences of an highly adverse character. The subject which I have thus very briefly brought to your view, demands the serious attention of the planter. The annual and extensive losses from new growth, proclaim its importance. I view

the disease as originating, in almost every instance, from our indiscretion, and therefore remediable. Would it not be a profitable consumption of time, to institute experiments on this subject? Of what avail is manure, if, by its use, we are as likely to sustain injury as to receive benefit? What doth it profit us to sow and not to reap? Be assured, gentlemen, we are yet tyros in our vocation. To dispel the gloom, which overshadows the science of agriculture, rests with the yeomanry. If they consult their duty and interest, they will no longer procrastinate the execution of that trust.

Very respectfully, your obedient servant,

WHITEMARSH B. SEABROOK.

Edisto Island, October 15, 1829.

ART. II.—*Report of the Inspecting Committee of the St. Paul's Agricultural Society.*

To the EDITOR of the SOUTHERN AGRICULTURIST.

Sir,—At a regular meeting of the Agricultural Society of St. Paul's Parish, held on the 7th inst. the following Report of one of its committees of inspection being read, it was Resolved, that the same should be published in your useful Register. It has been the practice of this Society ever since its commencement, annually to appoint committees for the purpose of inspecting the crops and management of the members. They have generally reported very candidly the condition of the several plantations within their respective limits, and these reports are recorded upon the journal of the society, whether they be favourable or otherwise.

SAMUEL KING,
Secretary and Treasurer.

REPORT OF THE COMMITTEE.

The Committee appointed by this Society at its meeting in April last, to inspect certain crops at Toogodoo, and Little Britain—Report: That the plantations assigned them were visited on the 18th of August, and presented at that period prospects of a harvest more or less abundant in proportion to the means which had been used to secure it.

The season, it is true, has proved adverse to the efforts of the planter, in a degree almost unparalleled; but under all circumstances, well directed industry will triumph over negligence and sloth; and the results, on these plantations, though materially affected by the cause just stated, have been such, relatively, as the appearances in August induced the committee to anticipate. In examining these crops the inquiries of the committee were principally directed to the manures used; and in every case, but one, those fields or parts which had been manured with salt-mud promised, decidedly, better than the rest on which other materials had been used. The field which formed the exception had been manured with pine-trash passed through the cow pen; the appearance of this cotton was such, at the time of inspection, as to induce the committee to expect from it a yield greater than that of the other parts of the crop on the same plantation by thirty-five pounds per acre; the rest of this crop was manured with marsh passed through the pen, with cotton seed and with salt-mud (a part of the mud was taken out and spread in the summer previous.) The result, however, did not accord with this expectation, for the mudded parts of this crop finally produced about thirty pounds more than either of the others.

The beneficial effects of salt-mud was strikingly apparent at one of the plantations visited—that of Mr. James King, Sen. And here your committee would remark, that they believe he was the first planter who successfully applied it to the cotton crop; that it is to this enterprizing agriculturist we are indebted for a knowledge of the excellence of salt-mud as a manure for cotton. The chairman of the committee well recollects visiting Mr. King's plantation in the summer of 1815, in company with a skilful planter of John's Island, for the purpose of witnessing the effect of salt-mud upon cotton, then and for several years before used by Mr. King; and the benefit was so evident, that Mr. King's practice was immediately adopted by his friend; whence it soon extended itself throughout the Islands in the neighbourhood, making worn out fields produce good crops of a superior quality. The committee use with pleasure this occasion to acknowledge the obligation under which they, in common with all cotton planters, within reach of salt-mud, have been placed, by the discovery of this valuable and inexhaustible manure.

At the period of the inspection, the hands upon Mr. King's plantation had been employed for some time in collecting mud from the creeks, and spreading it over the field. With a plank for each wheelbarrow, each hand brought out and spread a half task per day, within six or seven tasks of the creek; at a greater distance mule carts were used, the proportion observed was at the rate of four wheelbarrows to the task row. He intends to plant in cotton the next year in this manner. The corn crops on these plantations were generally good, manured commonly with cotton seed around the hills, and in one instance the corn was manured with one peck of live cotton seed to each task-row below the listing, the corn planted upon the list and attended mostly with the plough; this corn produced double the quantity to the adjoining field without manure. The crops of root potatoes upon close old land, well manured, promised well, but one crop of root potatoes being planted upon high new ground, has failed entirely. The cotton upon these plantations being all planted upon very large beds, has not suffered by grass. All which is respectfully submitted.

JOHN LAROCHE,
Chairman Inspecting Committee.

December 1, 1829.

ART. III.—*Observations on the Culture of Sugar in South-Carolina; by* Dr. R. FURMAN, *accompanied by a letter from Capt.* THOMAS BAKER, *giving an account of an experiment made by him in growing the Cane, and manufacturing Sugar near Stateburg.*

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Charleston, December 26, 1829.

Sir,—I make no apology for sending you the subjoined letter. The subject on which it is written, and the *fact* it communicates, are of paramount importance to the agricultural interests of South-Carolina. The writer is a gentleman well known in Sumter district and elsewhere, and of character too well substantiated to require a testimonial from me.

Having taken a deep interest in this experiment *ab initio*, and having ventured to predict, in various conversations

held within the last four or five years, the success of the sugar culture in this state—a prediction founded on certain topographical analogies co-existing in this state, Florida, and Louisiana,—I feel great satisfaction at the issue of this experiment of Captain Baker. The *important fact* announced by it, is: *That the sugar cane does, in this latitude, and in even an unusually short agricultural season (such was the last) mature its juice to the state or degree necessary for chrystallization!*

Nature then, having done every thing for man on this subject, it remains for *him* to organize his means; and, by anticipating the exigencies of the approaching season, to multiply his forces and so get his crop betimes into market. With these views he will reason thus: If a mill of a certain diameter, and one set of boilers, will get a crop of sugar, amounting to a given number of hogsheads into market in two months, or any other given time; two mills, with two sets of boilers, will do the same work in half the time. If there be danger to the cane, in the average of years, from not completing the taking it off from the fields before the first or second week of December, the remedy is apparent to the man of perspicacity and resource. It will consist in, 1st: Increasing the diameter or power of his mill to twice the capacity which his crop would call for in order to get it to market in the usual Louisiana period; or in employing two or more mills instead of one, augmenting the number of boilers in proportion—or, 2d, following the plan laid down by Mr. Spaldiug, viz: planting the cane as a co-crop with some other. I hold in my hand a letter from Wm. Kendall, agent of the West-Point Foundry Association, in answer to a letter addressed to him two years ago, on the subject of sugar mills; in which he gives, among other details, an account of mills of three different sizes, and plans of execution:

1st size. Rollers 4 feet long, 24 inches diameter, worked by 6 horses, grinds juice for 500 hhds. sugar in two months.
2d do. do. 3 feet 6 inches long, 22 inches diameter, grinds 400 hhds. in two months—5 horses.
3d do. do. 3 feet 6 inches long, 20 inches diameter, grinds 250 hhds. in two months—4 horses.

These mills are of cast-iron, and on the principle of horizontal rotation: the cost of the first size being $2,500, the second $2,000, the third $1,300.

Now, it is apparent, that to get out a crop of sugar, amounting for instance, to one hundred and twenty-five hogsheads in one month; the planter would employ the mill and boilers which would get out two hundred and fifty hogsheads in two months, multiplying his means of transportation from the fields to the mills, and his hands at the boiling-house, in a due ratio. But it is a point yet to be determined, whether the cane does not mature its juice to the chrystallizable degree at a period earlier than it is supposed to do. The point is worthy of investigation, and I hope the sugar planters will turn their attention to it. For, if it be found that the cane can be cut a month, or even a fortnight, earlier than is the current practice, the South-Carolina planter will be disembarrassed of a large portion of the difficulties by which he is clogged, and this state will, without doubt, assume her station within the limits of the sugar region. Two things may be taken into consideration, as *points d' appui* to this suggestion, viz: 1st. It was formerly supposed that *nine* months were absolutely necessary, in order to enable the cane to bring its juice to the granulating point—accidental fact has now demonstrated that not more than *six* are necessary. 2d. That some vegetables have the faculty of adapting their growth, and their degrees of maturity, to the season of the latitude in which they grow; prolonging or accelerating them at a rate corresponding to the longer or the shorter duration of the agricultural season of a low or of a high latitude.

The samples of sugar to which Captain Baker alludes, I herewith transmit. The sugar is dry and sweet, but the granulation is defective; the former bespeaks the perfection of the plant, the latter the imperfection of the process.

With respect, your most ob't serv't,

R. FURMAN.

An Account of an Experiment to Grow the Sugar Cane and Manufacture Sugar, near Stateburg:

"Near Stateburg, November 18, 1829.

Dear Sir,—Having completed my experiments on the sugar cane, I, in some haste, sit down to give you the result. The experiments were made with care, and I think afford sufficient data, from which a calculation of tolerable

exactness may be made of what might be expected from an acre of our pine land when planted in *cane* of the ribbon kind. I regret that I had not an opportunity of experimenting on that planted at the swamp (Wateree.) In appearance it was much finer than that planted at my home place, and, I think, would have been far more productive; but the mules getting into the patch destroyed the whole. I enclose you four specimens of sugar, the product of four separate boilings. The samples numbered one and two, were carried a little too far in the process of boiling; by which I think the grain is somewhat injured. From these two parcels I got no molasses, the sugar being reduced to the dry state you see them, solely by the action of fire. The parcels numbered three and four, the grain of which I think rather better than the two first, were also boiled a little too much; I infer this from the circumstance of my getting so little molasses from either. The sugar was put into bags and hung up to drain. From number four I got rather more molasses than from number three, and not more than half a gill per pound from either. No clay, or any other substance was used to separate the fecula from the syrups; a small portion of lime was used to assist the granulating principle. The strength of the juice in every experiment was tested by Beaumé's Hydrometer, which stood at 10 to 10½ in the syrup.

You know that I did not get the seed until the latter end of the month of March, and that it was not planted until the latter part of the first week in April. It was shipped to me from Savannah, put up in a box, in pieces containing three eyes each, packed in earth. Many of the plants had sprouted before they were received. The ground selected for the cane was in a corn field, (old land) the corn then up; it had been prepared in the usual manner for corn, with the plough, by lapping three furrows together, in ridges at the distance of six feet, and crossed with one furrow of the plough at three feet distance. The corn was cut out from each hill, or check, and one piece of the cane put in the place of it; the plant was covered from two to three inches, to prevent the influence of the sun, as the seed was then germinating. About the first of May the plants that were then up were singed by a frost. About this time they had a light hoeing, as also my corn; from thence, until the latter end of July, they were tended altogether with the

plough, in like manner with my corn. They were then laid by with the hoe, as also my corn, with a flat wide bed. On the ninth of November, the blades being killed by the frost, the stalks were cut down and housed.

Growth and produce of the patch.—On an average each plant, or cutting, produced seven stalks—the greatest number of joints that came to maturity, fifteen—the average, ten—the length of the stalk of fifteen joints was three feet ten inches—the medium girt four and three quarter inches—thirty joints weighed five pounds, produced one quart of syrup, which yielded five ounces of sugar, which is at the rate of one ounce of sugar, to one pound of cane, when prepared for the mill. This experiment of mine does not agree in all its parts, with what has been published in the Southern Agriculturist; for it is said there, that a good acre of cane will give thirty tons, which, at an ounce in the pound, would be 3750 wt. to the acre; they say also that the cane prepared for the mill, gives one third trash and two thirds juice, which I think an error. I say nothing as regards the quality of the specimens of sugar sent you; you can better form an opinion by comparing them with other sugar. My home place you know is *pine land*, within seven miles of Stateburg—latitude 34°.

Produce of one acre, calculated from the above data.—An acre of ground, thrown into ridges at six feet apart, and crossed at three feet, gives 2500 checks, requiring a like number of plants to set it out; 2500 plants producing seven stalks give 17,500 stalks. 17,500 stalks at ten ripe joints each, give 175,000 joints. Thirty joints weigh five pounds, consequently 175,000 joints are equal to 29,166⅔ lbs. and this, at one ounce of sugar to the pound, would give 1823 wt. of sugar to the acre, or 1458 gallons of syrup, which at five ounces of sugar to the quart equals the same; the whole of which might be manufactured in the course of twenty-fours, with machinery adapted to the power of two horses or mules, and the necessary apparatus, which I do not suppose would cost more than $300—(wonderful!) I have further to state, least any should be deceived, that the experiments were made under the most unfavourable circumstances, viz: the year has been peculiarly unfavourable for cropping in every particular; in the month of August (the month in which the cane plant is

most vigorous,) we had not rain enough to keep potatoe vines alive.

With sincere regard, I remain, my dear sir, your friend,
THOMAS BAKER.

Dr. R. FURMAN.

N. B. The produce of the cane as per my experiment, was one half of the weight, when in a prepared state for the mill, *trash*, the remaining half juice, more effective apparatus might have given a more favourable result. There is no necessity of planting the cane as early as recommended; the latter end of February, or the beginning of March is sufficiently early, especially if planted in the swamp where the land is so subject to be inundated. One acre of cane would raise seed enough to plant twenty-five acres, if planted in the way my patch was, six by three feet, in checks. The weight of which would be fifteen tons, *a heavy crop to set and gather.* From No. 1, 2½ oz. of sugar was made—No. 2, the same quantity—No. 3, 5 oz. of sugar—No. 4, 5½ oz. of sugar. All from the same quantity of juice.

ART. IV.—*On various Processes of Manufacturing Sugar; by* Dr. THOMAS COOPER.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Columbia, December 18, 1829.

Sir,—I observe a Mr. M'Intosh has obtained a patent for refining sugar with clay. This is not new. A patent was taken out in England, January, 1827, for the following process:—1800 lbs. of coarse sugar: 84 gallons or 672 lbs. of water: 16 lbs. pearl ash: 25 lbs. of fine clay, or fuller's earth, mixed with water enough to give it the consistence of cream. Boil these ingredients, stir them, scum the liquor: when boiled for a short time, pour it into a vessel with three cocks, placed at some distance from each other. Mount the vessel in such a way that it can be easily inclined without disturbing the liquor: this is best done by means of a vice. In from twelve to twenty-four hours, the top part of the liquor will be clear: draw it off: and so with the two remaining portions. The sediment is to be mixed with scum, for future operations.

Eight parts of juice of the sugar cane, ought to contain one part of sugar. It will also contain one part of oily, gummy mucilage: which in England they get rid of by about half a pound of white vitriol to one hundred gallons of juice: but of the utility of this part of the process, I am not certain.

They add to one hundred gallons of juice one and a half pounds of lime made into the consistence of cream with water, to neutralize the oxalic and probably malic acid contained in it. They add also now in the West-Indies to one hundred gallons of juice five pounds of bone-black.

They filter: they evaporate not by boiling in the usual way, but by forming a vacuum over the boiler by means of an air pump worked either by horse power or water power, or steam. The heat applied must not raise the liquor beyond 150 of Fahrenheit's thermometer at the very utmost. The usual boiling heat from 212—220 without the vacuum, converts the sugar into molasses, and chars the gummy and mucilaginous matter, colouring the liquor. The heat of the liquor in point of fact need not be above 120 of Fahrenheit's thermometer.

A substitute for the air pump can be found in Dr. Arnot's physics, p. 367.

The *essential* parts of the process in making good sugar, are, very gentle boiling with *bone black, and perhaps with blood*, whose albumen coagulated by heat, renders the impurities more easily scummed off.

Next, *Filtering*, which I consider indispensable.

Then, *boiling in vacuo*, which I am sure is equally so.

The present rough methods will do, while the present high prices continue. But competition is gathering all around; and will be very extensive in three years from this time. He who applies most science, will gain and save most money.

To those who mean to plant sugar, I advise, a rotation of crops. Sugar should not be a crop more than once in three years. The earlier it is planted so as to be secure from frost the better. Three rollers, disposed two below and one above, promise to be better than three vertical rollers on end, where the middle one turns the other two.

It is pretended sugar can be made out of molasses. Hitherto nothing but a coarse coloured article has been so made, called *bastards*, and used to adulterate brown sugar. White

sugar *can* be made from molasses, but I belive not with profit. I have tried the English process first above given (with clay or fuller's earth.) It will produce a great improvement, but it does not make a white lump sugar.

Mr. Archibold of New-York has patented a process for refining sugar, about eighteen months ago, very similar to Mr. Howard's: but the specification does not contain the real process now used by him.

Mr. Ebenezer A. Lester in August last took out a patent for evaporating and concentrating cane juice by steam; which as it contains nothing new, is of no value.

Mr. W. Oaks & Son, (Houndsditch, London) advertise a series of vacuum boilers and filters applied to cane juice, which have merit, but they are very little different from Howard's specification in the Repertory of Arts. It appears to me, however, the best process hitherto given for clearing and concentrating cane juice.

As to the *refining* of sugar, some experiments I am now making convince me that the best and cheapest process has never yet been published either in England or in this country. I shall ascertain this in about a month.

I am, dear sir, your obedient serv't.

THOMAS COOPER.

Note by the Editor.—In Gill's Technological and Microscopic Repository, (October, 1829) is an account of an "Apparatus for evaporating syrups," which has recently been brought into notice in France, and which is to be recommended for its great simplicity.

"A copper boiler, hermetically closed, and some wooden vessels, in fact, compose the chief part of the apparatus. The vacuum is made by steam, and the steam is afterwards condensed by cold water, so simple is the process. The apparatus does not require the employment of any pump, nor of any other auxiliary machine, as it performs its functions without motion. And thus, not only is the vacuum produced and preserved without the aid of the pneumatic pumps, which are employed in Howard's English apparatus, but the water necessary for the condensation, rises of its own accord into the reservoir destined to receive it, and which is elevated from eight to ten feet above the surface of the earth. The management of the apparatus is also much less complicated than that of Howard; and thus a workman possessed of the least degree of intelligence can govern it; in fact, it is reduced merely to the turning of a few cocks! The steam is also produced under the

ordinary pressure, which removes all idea of danger. The proofs are taken by drawing out the boiled sugar into threads, as usual; and an instrument is applied to the boiler, which permits us to extract a small portion of the sugar from time to time, and without suffering the air to enter the boiler. This instrument differs entirely from that used in Howard's process, it is not only more simple, but is also more convenient."

The atmospheric pressure being removed, ebullition is produced by the steam when heated to eighty degrees of Reaumur's thermometer, and "the sugar boiling is thus effected at a temperature of from fifty to sixty degrees."

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"The vacuum pan in M. Roth's apparatus, evaporates from an equal surface, with much greater speed than an open boiler, placed over an open fire. When established upon a proper manufacturing scale, one pan will boil nearly four thousand litres of syrup daily."

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"Its construction is solid and simple, and the absence of all friction renders the keeping of it in repair easy, and, of course, at but little expense.

The advantages which it presents, are, first, to produce an economy in the heating; secondly, the boiling the syrups without weakening them, and thus affording better and more beautiful products; thirdly, making more sugar, and less molasses (about ten per cent.;) fourthly, shortening the time of claying the sugar; fifthly, causing the inconvenient and noxious vapours usually produced from sugar-refineries to disappear; and, lastly, to procure a great quantity of hot water, applicable to various purposes." We regret that so imperfect an account is given of the apparatus, as to render it impossible to obtain any definite idea of it, for no plate or specific description accompanies the article.

ART. V.—*Observations on Bordering our River Banks with Orange Trees, and protecting the embankments with Bermuda Grass; by* THOS. SPALDING, Esq.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Darien, December 12, 1829.

Dear Sir,—Your letter of the 7th of December is received. It will give me pleasure, as I have heretofore assured you, to contribute my mite to your paper. At the present moment, however, from the illness of one of my children,

my mind is so repeatedly called off from calm reflection, that you must take a rambling letter upon various subjects, in the place of a deliberate communication upon one. The first circumstance that occurs to the mind, in the present season, is the strange and untimely visitation of frost and ice in November. A visitation which has stricken down the expectations of the cotton grower, and the cane planter, even below the very humble expectation which the previous drought of the season had left him, nor can we, upon this subject, but reflect how strangely, for some years past, the elements seem to have lost their balance. The past year we had a Virginia winter, commencing in the month of January, the previous season we had no winter at all, but in the month of April, after our trees were in flower and foliage, the North wind appeared to break over our Western mountains, bringing blight along with it, even to our forest trees. Bartram records the same thing to have happened in the year 1766, and to have extended as far south as Musquito river, in Florida. The causes of these vicissitudes are in all probability beyond our reach, we know them at least, to be beyond our control. Vicissitudes of this character, however, belong to every country, and to every climate, and attach themselves to every pursuit. We have read Hogg's tale of the sufferings, (I think in the year 1787) when there was weeping and sorrow on every hill, and through every valley in Scotland, for the herdsman and his flock had equally perished in the snow storm.

In one of the last years of the government of the Duke de Richelieu, of the southern provinces of Russia, two millions of sheep perished in one year in the snow—in the single province of which Odessa is the capital. Yet these misfortunes did not turn the inhabitants of either Scotland or southern Russia, from their grazier pursuits; neither should the cold of the last winter divert us from our previously determined objects; for of all the qualities that belong to man, perhaps the most important to his ultimate success, is perseverance—I might say impassioned perseverance. What has covered the granite steps of Switzerland with fruits and flowers, with grain and wine, but perseverance? What has scooped a country out of the German ocean for the Hollander, but untiring industry, urged on by unyielding perseverance? Like these people, we have liberty to quicken and lighten our labours; nor are we without

wrongs to stimulate our exertions—We have a country full of capabilities ; the alluvial lands of our many rivers, from Wilmington to St. Mary's, is a country of itself capable of maintaining millions of inhabitants ; for, in extent, it is greater than Upper Egypt, from the Cataracs to Cairo ; nor is this alluvial region, like that, surrounded with a desert, but on the contrary, interspersed with a country, abounding with every variety of soil, and applicable to every variety of culture, and purpose. But let us descend from general observations, to particular, and making your book the medium of exchange, impart to all, what at present may belong to a part.

In the winter of 1815, the late Gen. Rutledge spent a few days with me at Sapelo Island. Anxious to interest and amuse, I took him to Maj. Butler's plantation, on the Alatamaha, where, for the first time, they were manufacturing sugar from cane grown on river land; but it was not the sugar, though the crop was good, nor the alternate fields of rice, and cotton, and cane, that most forcibly struck him—it was the orange hedges, of five miles in extent, which bordered the banks at the water-line upon their exterior, which most forcibly attracted his observation, and called forth his admiration—the trees were bowed down with their weight of fruit. These beautiful hedges are still bordering Maj. Butler's fields, and are still covered with fruit, for the rivers running round them, tempers the cold, while their waters secure and improve the crop. Neither the repeated hurricanes which we have had since, nor the visitations of sea-water, that have accompanied them, have been able to break down, nor destroy these hedges. Why then is not this example followed? The orange tree will grow better upon the river banks, than upon the high lands adjacent; they occupy no available space, they strengthen, and shade, and beautify, the banks. Sir, it was the orange trees that formerly bordered the banks of the Mississippi, that every traveller delighted to dwell upon—they have passed away, not a remnant of them remained when I was there in 1825. Not so with us—not so with you, even as far as Charleston. Let us add, then, these beautiful orange groves to the river scenery of our country ; it will cost but little care and still less labour, while it will add to the comforts of our negroes, by giving them acid after salt, the next essential sauce for every food.

But what is more important to the cultivators of our reclaimed river lands, than even the orange tree, is the Bermuda grass, for coating the embankments; it was with surprise, in this quarter of the country, that we have learned, that this grass has not, in Carolina, been introduced upon their embankments; it spreads, after two years, completely over the bank, and protects it against any freshet, and against every flooding, whether from the river or the sea; it grows but the higher and stronger from these overflowings, binding together each successive deposit, but even this is the least of its qualities, for it is the best and most nutritious of all grasses, for stock of every kind, and if ever this becomes a grazing country, it must be through the instrumentality of this grass. For a long time it was dreaded, least getting into the cultivated parts of the field, it would overpower the cultivator; this fear is not groundless upon high lands, but altogether so upon river lands, as water will bound and limit it, the long flooding for rice confines it to the banks, and even in the alternate culture, the alternate rice crop so limits it, while the complete sward it affords, protects the banks from the tread of the larger animals. Who introduced it into the country, or gave it its common name of Bermuda grass, we know not; from Bermuda it did not come. I have often supposed we owe this gift, among others, to Mr. Ellis, one of our first governors, an enlightened and patriotic man, who had been in India; for it is the Doub grass of the middle provinces of Hindostan. Some years ago Mr. Crawford, then Secretary of the Treasury, among other things, sent Mr. Bulloch of Savannah, and myself, a small bag of Doub grass, which he had received from India: what was my surprise to discover upon examining it, that it was the Bermuda grass of our own country.

In India, where the cow is the first object of adoration, this grass as the best food of the sacred animal, partakes of some portion of its sacred character, and after the water of the Ganges, is the most sacred of inanimate objects; nor is this to be wondered at among the Hindoos, when I say to you, that sixteen acres of Bermuda grass in front of the city of Savannah, for many summers, maintained twenty horses, forty head of cattle, and one hundred sheep; as many now living well remember, and would readily attest. I will refer you for a figure and description of the Doub grass, to the fifth

volume of the London octavo edition of Sir William Jones' works; he there speaks of this grass as among the most beautiful as well as the most useful of vegetable productions; and it is so, but its beauties must be sought for in the microscope. I presume you have some of this grass around Charleston; if not, in the month of May, when in bloom, I will send you a box of it, when your men of science may compare it with Sir William Jones' drawing and description. The Marquis of Hastings, returning from his government in India attempted to introduce it into England, but mistook the soil, instead of planting it in watered meadow, he placed it in the hot-bed of a green-house, where it perished.

I remain, dear sir, your obed't. serv't.

THOMAS SPALDING.

ART. VI.—*On the Cultivation of the Chickasaw Pea, and Bonavista Bean; by* N. HERBEMONT.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Columbia, (S. C.) November 30, 1829.

Dear Sir,—Although I had not intended making any experiment on the Chickasaw pea, (having on my hands many others, that required all my time and attention,) I planted some for fodder. I had a few rows of it cut and cured by themselves, which on weighing, were found to be at the rate of 4826 lbs. of *excellent and well cured forage*, per acre, on a soil naturally very poor. They were planted in rows twenty-six inches apart, on land tolerably well prepared by ploughing, after having had a sprinkling of manure. The ground had been planted the preceeding year in potatoes, and in grape vines this season. Two rows of peas were planted at the above distance from each other, between the rows of vines. The time selected for cutting the pea vines, was after having gathered from them something less than one-fourth of the peas they might have produced. Being thus cut just after they have begun to bear, many peas are left on the vines, and add considerably to the nutritive quality of the fodder, when at the same time the plant is yet

in its full vigour. I hope other gentlemen will give you the result of their trials, and that they will prove very satisfactory. For my part, I am more and more pleased with this plant, as it makes, most unquestionably, and with little trouble, a great abundance of very sweet forage, which horses and cattle eat very greedily, even to the very hard stems as large as a man's finger. I also hope that experiments have been made with it for the purpose of manuring by ploughing it in green; for there can scarcely be a doubt of its answering as well for this object, as clover at the North, to which it will probably be found very little, if at all inferior.

I have planted the small parcel of Bonavista beans, which you had the goodness to give me. They were planted rather late, but grew admirably well, and produced a most abundant crop. They continue to bear for two or three months, long spikes of flowers and fruit, with this great advantage, that the beans do not shell out, and that, if they are not gathered as soon as ripe, they may remain on the plant till the fall, without injury or loss, and then be threshed out. They require no support, and grow about three feet high. With regard to their quality as food, I am not so well prepared to speak positively; but it appears to me, that they are very little inferior to the Sewee or Lima bean. They, perhaps, require boiling a little longer; for those we had cooked, were not quite soft enough, though well tasted. Wishing to keep as many for seed as possible, we used but few for the table. It is also probable, they may be cultivated very advantageously as provender for cattle, as I think they will be found to bear more than the ordinary Cow pea, and may be gathered and cured, vine and all, without risk of losing any of the beans by their shelling out in the operation of drying.

This is, therefore, one of the many benefits conferred on your country, by your various efforts to serve it; for which I hope you will meet with gratitude, as well as due emolument.

I am, very respectfully, sir,

Your obed't. serv't.

N. HERBEMONT.

Art. VII.—*Memoranda of a Crop of Corn, grown in St. Andrew's Parish.*

To the Editor of the Southern Agriculturist.

Sir,—I planted on Mr. A. Middleton's plantation the present year, 1829, sixteen acres of corn. It is necessary to state, that this land had been planted the year previous, in corn, and about the first of February, the corn stalks were all listed close in the alley; it remained so until the last week in March, when I commenced carting out the cow pen compost manure. From six to seven cart loads of manure were put in the centre of each task; the 17th and 18th of April the manure was spread on the list, and bedded up with the hoe, and planted on the 21st of April, the beds five feet from centre to centre, and from forty to forty-five hills in each task row. The holes were made with a five inch hoe, and each hole opened down to the manure, the corn dropped and covered with a hoe; the corn came up well, needed no supplying. The third week in May it was hoed and thinned out to the stand, leaving two stalks in each hill. Four or five days after the hoeing, the Davis plough, drawn by one horse or mule, was put in, and the alley well ploughed up; the second week in June, a pint or upwards of dried cotton seed was applied to each hill, and then well bedded up with the hoe; no more was done until the last week in June, when another hauling took place, covering all the cotton (which was then five or six inches high,) snugly around the root of the corn; this was the last halling. The third week in July it was hoed very lightly, and hand picked in the hills, the little grass that was hoed up, raked lightly to the side of the bed; the blades were stripped the last week in August, and the second week in September the corn turned down. This sixteen acres of corn was broke in, the 3d and 4th of November, and measured by a barrel, the product of the whole, was, one hundred and forty-four barrels of sound corn, and sixteen bushels of shelled and rotten corn—the barrel when shelled and measured was found to contain four bushels and one pint—one acre measured separately was forty-three bushels; there were several others, in my opinion, just as good. This land is located near the rush land, and is a hard stiff soil, part clay, and part sandy soil. I must also state that this land is well drained, with good leads to take off the water.

A. B.

ART. VIII.—*On Horizontal Ploughing; by* J. JOOR.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"The Hills, (near Woodville,) November 12, 1829.

Sir,—In compliance with your request for further information on the subject of level ploughing, as practised in the state of Mississippi, permit me to remark that it would have been a happy circumstance for the state of South-Carolina, if it had been introduced along with the cultivation of cotton, as there is no crop which destroys a broken plantation so quickly, when ploughed in straight lines.

I have known lands in my neighbourhood which appeared to be entirely deprived of soil, by the rains, restored by deep level ploughing, without any manure being applied, but breaking the cotton stalks produced on the land, and ploughing them in. The first mode practised in levelling our fields, was the same used by Mr. Simkins, but we soon found it useless, and employing too much time. The most approved mode of laying off a field, is for some intelligent person (a smart negro will do it very well) to commence a leading furrow at one side of the field about half way between the top and bottom of the hill; the man who directs the work to walk in front of the plough, with his hat drawn down so as to confine his sight to thirty or forty feet, by which, with a little attention, he will not loose his level track. He will lay off from this furrow until he finds he is loosing his level, when he will make another leading furrow in the same way, and fill up the interval with short rows.

This mode of laying off a field is considered as accurate as is necessary. The increase of labour from level ploughing, is either imaginary, or confined to the awkward process of the first year, when the ploughmen are inexperienced. For my own part, (after the first year,) I have found a field as easily cultivated in level, as in straight lines, and have always planted the same number of acres to the hand. Whatever increase of labour arises from drilling the corn crop, instead of cross ploughing, is amply made up by the increased product.

For the last two years the rains have fallen in greater torrents than I have witnessed during seventeen years. During the last summer the rains were so severe, as to make occasional breaks in the fields, but the soil has not been carried off, and the small breaks are easily filled with cotton or corn stalks.

I have enclosed a small sample of Sea-Island cotton raised on a plantation I have, which bluffs on the Gulph of Mexico, near the Bay of St. Louis. My last crop from that place, sold for 12*d.* round, in the Liverpool market. I will be obliged to you to remark how it compares with the finest Carolina cotton.

I am, respectfully, your ob't. serv't.

J. JOOR.

Note.—It appeared to be of the quality of common Sea-Island cotton, but the quantity was so small, and dry when it reached us, that it was impossible to form a correct opinion of it; the best criterion to judge of its quality, is, the price it bore in the Liverpool market, compared with that of the Sea-Island and Maine cottons.—*Ed. So. Agr.*

ART. IX.—*Observations on the Agriculture of the Middle Districts of South-Carolina; by* R. WATTS.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Mount Vintage, November, 1829.

Sir,—In offering the following remarks on the subject of agriculture, the only object in view, is, to benefit my fellow planters, with the hope, that they may be induced to abandon the old and miserable mode of husbandry, so long pursued by a majority of them, injurious to their interests.

The reflections submitted for their consideration, is not derived from theoretical speculation, but is the result of practical knowledge. The analogy of all God's creation, from the human species down to the vegetable kingdom, is conspicuous; corresponding with the economy of his providence. On this occasion, a similitude will be used, to illustrate a few remarks, particularly as relates to our two staple products. When there is a redundancy of blood in the human system, the surgeon will apply the lancet, which gives relief; should, however, the same practice be observed, with an enfeebled constitution, it may cause death; so with plants in a high state of vegetation, the plough or hoe may be freely used, but touch those, that are like the feeble

condition of man, and at an improper time, if destruction does not follow, the expectation of its product will be disappointed. In most instances the plough *must* progress, for the performance of a certain quantity of work, without regard to the state of the weather, or the condition of the plant, and at the close of the season, the planter is astonished, that his crop has fallen so short of his calculation, not at all attributing it to the want of judgment or skill, but that *the seasons have been too wet, or too dry.*

In proceeding to point out other causes of failure, among the most prominent is the neglect of rotation of crops. Lands that are continually planted in corn and cotton without a change, become tired (if the term may be allowed) of the same culture, which if alternated, would yield more abundantly of either. It would, however, be more judicious, to fallow them occasionally, keeping off stock, or to sow them in grasses.

Horizontal culture is next to be considered of the greatest importance. In our broken country it not only prevents the land from washing, but retains the moisture, of which there is so much need in dry seasons, and these seasons may be expected annually to occur. It is a mistaken notion with most planters, that more work can be performed up and down hill, than in the horizontal way, merely from the idea of so many short rows being made by the latter mode, not reflecting, that a horse going upon a level, will execute, if not as much work, yet it will be more effectually done, and with greater ease.

In the up and down hill culture, the horse is urged in ascending, and becomes exhausted; this with his caution in descending, leaves the work imperfectly done, making furrows which act as drains, subjecting to washings, not only the intermediate spaces, but the beds or hills on which the plant is growing; carrying the soil to the tributary streams, thence to the river, enriching the river lands at the expense of the hilly country. Latterly, however, the Beach Island planters, and others on the river, complain that, instead of the deposits of soil heretofore afforded them, clay and sand is substituted, impoverishing their lands. Deep ploughing, particularly horizontally, cannot be too highly recommended, regulated by the depth of the soil, and lessening the depth of ploughing as the plant progresses to maturity. It is not an uncommon practice to plough deep in extremely

dry weather, from what is termed raising the moisture, when every intelligent planter knows, that it only has a tendency to absorb the atmospheric moisture; and this may be carried to excess in the absence of this moisture, unafforded by dews, which occurs for nights in succession every season; evidenced from the plant not having revived from the withering occasioned by the previous day's sun.

The application of the plough at such a time, cuts and wounds the lateral roots, leaving them but partially covered to encounter the scorching influence of the sun; subjecting to evaporation the little moisture, that otherwise would contribute to the support of the plant. A light hoeing, merely to destroy the grass, or the use of the scraper, would be preferable.

Ploughing is also injudicious in the latter part of the season; it is often done to assist the growth of the plant. The effect will be produced to the injury of the fruit, robbing it of the sustenance intended to perfect it. At this period, vegetation ought rather to be checked, than promoted.

Parsimony, with regard to implements of husbandry, is a most egregious mistake. What product can be expected from a crop, attended altogether with the common shovel plough. This kind of plough acts very well in its place, but to be used on all occasions, proves the want of observation, or that sordid feelings will not admit of alteration.

The implements of husbandry, should be of various descriptions; and their application should correspond with the nature of the soil, the state of the weather, and the seasons. It would be folly in the extreme, when the earth is too highly saturated with moisture, to throw up earth to a vigorous plant, thereby promoting a growth, that may have been already too luxuriant. And it would be equally imprudent to take from plants that are affected by dry weather, the earth, that barely retains sufficient moisture to keep them alive.

Over planting, is another error frequently committed. Twelve acres of corn and cotton to the hand, (half of each) well attended, will produce more than fifteen or twenty, superficially worked; lessening the labour of both man and horse.

ROBERT WATTS,
Of Edgefield District.

ART. X.—*On the Resources of South-Carolina; by* WILLIAM ELLISON.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Fairview, May 25, 1829.

Dear Sir,—The low price of every thing raised by the farmer, leaves him but a small revenue at the end of the year. A brighter prospect, however, I am in hopes, is opening for us—as we are here very confident of the complete capacicty of our climate, for the raising of silk of the finest quality. I am trying an experiment with salt as a manure for cotton, and will inform you of the result. I have also planted a parcel of Havana tobacco, to be made into segars, to test the capacity of our soil and climate to raise it. A planter of my acquaintance, Mr. Reuben Harrison, has planted the Brazil tobacco, (as it is called) for ten years, and he says he perceives no signs of degeneracy in it; but that it retains its qualities, and is certainly a very fine tobacco. He thinks the Havana tobacco may be successfully cultivated. I will inform you of the success of any experiments with it. I am convinced that we know little, as yet, of the resources of our climate and country; and that nothing but energy and enterprize are wanting, to display them to an extent, of which we have, at present, but little conception. Except on account of present inconvenience, I am glad of the decline of cotton; for we may be assured, if that article had continued at encouraging prices, we would never have attempted (until our lands were completely ruined) any thing else. But the low price of that commodity, and the belief which is gaining ground, that under any circumstances, it can never rise to an encouraging price, unless its culture be greatly curtailed in all the cotton regions of the globe, is beginning to awaken a spirit of inquiry among all classes, which may be productive of great good. I have differed with you, and in fact with the great majority of my friends, on the subject of the effect of the tariff laid on Southern interests. The last law was certainly unwise and impolitic, more calculated to injure the manufacturing interest than the Southern states. My own opinion has always been, that, if we look to them

as the cause of our decline, we are mistaken; but as I think a paper like yours, should avoid politics, and leave such discussions to the ordinary journals of the country, I shall say no more on the subject.

Mention was made in a former number of your paper of an intention on the part of the citizens of Charleston, to establish a cattle market. The plan, I think, might be of great advantage, if carried into execution. Our middle or hilly country can never become extensively grazing; but there are many parts of the state where cattle might be profitably raised. There are even here a great many cattle which cannot be disposed of to profit. If we take great pains to feed and fatten them for market, we are, after the trouble of driving them to a distance, exposed to the combinations of the butchers, and compelled to submit to their terms. This is said in nothing like a spirit of prejudice against them, for if we were in that trade we would act like them; but an establishment that would throw open the market to general competition, would benefit both the city and the country. I have often, when travelling through the lower country, observed with regret, the decline of that interesting portion of the state; and have indulged the reflection, that if there were no lands elsewhere, to tempt the enterprising, and draw away the capital of the country, it might be made the Flanders of America. Perhaps it might be said that if labour and capital could be employed there in that pursuit, but few parts of the United States, if any, would be better adapted to the purposes of grazing. If ever the period should arrive, when extensive drainage, founded upon topographical surveys, and scientific principles, should bring under proper management the extensive swamps, lakes, and savannahs, of that country, it may become as healthy as almost any other portion of the state, and exhibit a very different appearance. When we reflect on the urbanity and frank hospitality which has characterized the inhabitants, especially the better order of the lower country, we must all, who have known it, regret its decline, and wish to see it revive. An institution like that already spoken of, may possibly be of essential benefit to it; if sugar, or some other staple, should not prove more lucrative and alluring. There are even here extensive tracts of deserted old fields, which might be employed as grazing lands, with a prospect of reasonable advantage to their owners;

but now are generally left open, unenclosed, and neglected. They, it is true, would be comparatively poor and unproductive, compared to the inland swamps of the lower country. Future researches, I believe, will unfold the mineral resources of the state, to an extent, at present but little anticipated. I think it not impossible, and perfectly within the range of probability, that a few years hence a very different scene of encouragement, of hope, and of successful enterprize, will open to the inhabitants of this state; as I believe, that in its mineral and agricultural resources, and in its capacity for certain kinds of manufacturing, taken collectively, it is exceeded by no other state in the union. These may be pronounced, and may be in reality, the dreams of a sanguine imagination; but time will test their fallacy or correctness. I have drawn out these unimportant observations to some length, and will conclude by subscribing myself a friend to the success of your useful labours.

WILLIAM ELLISON.

ART. XI.—*On Grape Vines; by* GEORGE J. F. CLARKE.

To the EDITOR of the SOUTHERN AGRICULTURIST.

Mr. Editor,—In continuation of my last number, attempting to simplify, in some measure, the culture of the Grape vine, I beg leave to add—When in this age of reason, we find, that all the knowledge derived through past times, partake of mystery and prejudice, we cannot expect to meet the culture of the grape, an article so universal, so long known, and so much valued through the cycles of man, without its portion of clogs and incongruities. We know, that even at this day, it is not the philosophical enquirers, but the labouring classes, who generally cultivate the vines as well as the corns and grasses; and, that in all countries, and with but few unessential modifications, they travel the same beaten paths of those who went before them. We find, too, in the culture of the grape, those variations consequent on that unfavourable meeting of local circum-

stances, we call a bad season, which occasionally renders nugatory the best union of soil, seed, condiment, and care. And, that there are many who, in their accidental success or loss, attribute superiority or blame to some unimportant form or method they used; and presume to assign causes, and explain operations and effects, which the wisest do not comprehend, nor ever will. Hence the diversity of opinions, and embarrassing contradictions we meet with in so many cases. For instance, a vine dresser of France, cautioned me strictly against the use of a crow bar near the roots of a grape vine; assuring me that he had had some fine vines poisoned by iron; a wooden dibble only should be used. And a gentleman from a grape country; gave me as the cause why some grapes of a bunch had rotted, that the branches of the vine spread wider than the roots, consequently the fruit fell short of nutriment.

A general enumeration and dissection of all the folly to be found under the character of art, when comparing the management of grape vines in different countries, would be as unnecessary to the man of reason and inquiry, as it would be futile with the prejudiced. There is one, however, from its great spread, and very general influence in augmenting work, and endangering and mystifying this culture, which ought to be noticed:—This is a practice founded on the erroneous opinion, that the grape-vine is perpetually disposed to exhaust itself: which is, that it will grow and produce as much in one year, if not checked, as it ought to do in several; and by that means become puny, sick, or die outright; as though this plant had the singular faculty, and unceasing propensity, of drawing in advance, and to its own ruin, on nature's exchequer.

From this extraordinary practice, vines that we want to ascend a stake six feet high, must be four or five years effecting it, (though they would run up twice the height in one,) by cutting them down to short stages, in order, as they tell us, to check their too great exuberance of growth! In the same spirit, vines are bled every two or three years by circular and longitudinal incisions, to get rid of the superfluous *sap*; others are twisted to check it. Even eyes of a conical and convexed form, and those that shoot their buds inclining to the East or West, are all of moment in their relation to this *sap*. A supposed accommodation, limits too, the quantity of fruit the vine is allowed to bear

and greatly influences (as believed) the quality of the wine they will produce. Even the life of the plant, and, at least, its duration to an advanced age, is made to rest on the safe bridling and sure guiding of this mysterious *sap*. All which, and much more, the boors of Europe, and many of their lettered gentry, understand, (as they think) to a tittle, and manage to perfection. Another evidence, that the most ignorant, are ever the most ready at assigning reasons, and explaining causes and effects; and that the informed are generally too indolent to examine before they adopt opinions.

The facts are, that the body of the vine, which ought to be of a piece, in kind as well as length, like those of all other fruit plants is in several splices, of as many years growth. I do not know that this is radically wrong; but it is not practically right, inasmuch as it calls forth considerable additional time, work, and art, to effect it; and a good portion of fruit is lost by it. Moreover, the cutting off and joining in another part has left at each time a stump, three, four or five, to each vine; which nature has to get rid of, by rot and absorption, under a risk in each case, of leaving the vine, ever after, a hollow body. Nor are the incisions without dangers, as well as being in themselves an absurdity. But books, &c. to the contrary, notwithstanding, would it not be better to run the vines up at once to their full height, or as nearly so as possible; leaving formed, at the same time, on those intended for stakes or trellises, as many side branches as may be wanted; and then regulate, as each cultivator may please, by cutting off the superabundant fruit, should there be any such? This would be my method, had it no other recommendation than to keep from perpetually peddling in cunning art, and bombastic mystifications.

It is high time, that, by reasoning for ourselves, we should set aside altogether the follies of former days. Neither Noah, nor Bacchus, nor their contemporaries nor successors, could, nor can the boors nor gentry of Europe, see deeper into a grape vine, than we can:—Understand me; there is no doctrine so bad as to contain nothing good; nor any so good as not to admit of improvement. Whoever has raised, or seen raised, oranges, apples, or peaches, cannot go much wrong in raising grapes even in their beginning; and then, if not blinded by prejudice, they are sure to

improve. My vote would be, that we should in all our trees, delight in, and encourage, their most vigorous growth, and hail their most bountiful crop of fruit; considering it an easy and welcome job to thin off, should the weight endanger their limbs; or should a little larger size in the fruit be more desirable than their quantity; leaving altogether to nature the stewardship of her *sap*.

I would observe here, that we may be sometimes surprised by hearing, that in England good grapes are raised out of season; and those of an uncommon size during their natural season. This is the case, I have no doubt, in green or hot-houses, and at a great expense; in order to pamper the extravagance of the rich, who, probably, pay several guineas for a bunch, as well as a guinea for a pint of green pease, or a musk-melon not much larger than a pint. But this is not done by mere peasantry, nor mere gentry, but by London gardeners, who understand how to apply the agents of nature in making an artificial season, and mending a natural one; the principal of which is heat: like hatching eggs in an oven.

With great respect, your obed't. serv't.

GEORGE J. F. CLARKE.

St. Augustine.

ART. XII.—*On Rearing of Poultry; by* A LADY.

To the EDITOR of the SOUTHERN AGRICULTURIST.

Sir,—In choosing poultry, those of middling size and of a black colour, are the best. Fowls that are too fat do not lay abundantly. They should not, therefore, be fed too high. Young fowls begin to lay about February, and produce a greater number of eggs, but old fowls are the best setting hens. Never attempt to keep more poultry than you can conveniently feed; for a small number well fed, is better than a large number ill fed. There is no profit in raising poultry when you buy grain. When you purchase a new fowl, you should not suffer him to be put into the

fowl-yard without previously fastening him by a string, throwing grain around him, thereby enticing the other fowls, who will be disposed at first to fight him, and perhaps destroy him, but by careful watching this may be prevented. After a little while, they will be reconciled to the new comer. Poultry should be fed early in the morning, and in the evening, about sun set. Regularity of feeding is of great importance, both as regards time and place, except during harvest, when the poultry can take care of themselves. Cleanliness and shelter from storms and winds, are essential to the health of poultry. They are to be fed with grain ; vetches ; peas and potatoes boiled ; six ounces are sufficient for the out door, and eight ounces for the fattening poultry. Clean water is essential to prevent the pip. Mulberrys and figs, melons and salad, are very refreshing in summer. Poultry should be nourished particularly in winter. The fowl house should often be cleansed out and perfumed with herbs, such as thyme, majorum, or juniper berry, and all sorts of smoke, to drive away bad air and vermin. The straw in the nests should be changed every ten or fifteen days. Hay is preferable to straw as it is warmer and softer, and less subject to engender vermin. They should have a supply of ashes or sand where they might roll and trim their feathers. Ashes also kill vermin. Poultry that are kept too fat will not lay. To make poultry lay in the winter, they should be shut up in a warm place. Eggs may be preserved many years, by a coat of varnish, or by pouring over them warm mutton suet, so as to fill up the cavities between the eggs. This will preserve them many years.* They are preserved many years in the East, by surrounding them by a paste made of ashes and strong brine. Hens generally sit upon fifteen or twenty eggs. Young hens should be put to sit in some quiet place, where they may not be disturbed, nor should their eggs be handled, as it deranges them. When the chicks are hatched, they must be kept in a warm place, sheltered from the rain which is fatal to them. The common fowls are originally from Persia. They should be fed on ground corn, barley, and cooked turnips; they should not be suffered

* It is said that eggs can be preserved by being immersed in water containing a solution of salt and lime.

to go out except in the sun-shine, until they are a fortnight old. When a number of eggs and chickens are wanted, they put the chickens of several hens to be conducted by one. Sometimes they employ a capon, the feathers from whose breast are previously plucked, and then whipped with nettles for two or three days in succession; the capon is then confined in a narrow cage, where some chickens are put to feed with him, the soft plumage of the chicks sooth his wounds, for which he is grateful, and does not forget the favour, when he goes abroad, and to these chicks others are added. Hens when sitting, are uncommonly fond of water, and should be abundantly supplied, and that fresh. The time of incubation is twenty-one days. Some hens will lay from one hundred to one hundred and fifty eggs in a year. In some hens the desire of incubation is so great, that some will repeat five or six times a year, others not more than twice. This should be attended to, so as to provide abundance of eggs from the one, and chickens from the other; the chickens first hatched should be taken away and put into a warm place, or a basket. They must not be let out too early in the morning, nor suffered to range over the wet grass. Nearly all the disorders of gallinaceous fowls proceed from moisture.

A Mr. Wakefield, near Liverpool, who raises a large quantity of poultry, has a large enclosure of slabs of nearly three quarters of an acre, inclosed with a fence of slabs or any thinnings of fir set at end, six or seven feet, and pointed at the top, which will prevent the fowls flying over. Within this, are places slightly put up, but secured from wet, with a pond or current of water running through it. The poultry are fed three times a day on boiled potatoes. Poultry houses should be strewed with sand, ashes, and lime, rubbish, &c. There are several varieties of the common fowls, such as the Game, the Dorking, the Poland, the Bantam, and the Malay. In fattening poultry it is common to confine them in a dark place, so that they may have repose, but when there is room it is perhaps better to feed them high with boiled food, and allow them that liberty after which all animals pine. These observations are offered with a wish that they may be of service to the Agriculturist.

PART II.

REVIEW.

ART. I.—*On the culture and uses of Potatoes; accompanied by Engravings, and Practical Directions, explanatory of the best modes of raising, preserving, and using that Root: proving, that Great Britain, by extending the culture of potatoes, can be rendered completely independent of other nations for the necessaries of life; and pointing out a variety of new uses to which potatoes are applicable.* By the Right Honorable Sir JOHN SINCLAIR, Bart. Edinburgh. 1828.

(Continued from page 48.)

THE next inquiry relates to the *cuttings or sets*, which is discussed under the following heads, 1st, "The size of the seed potatoes and of the cuttings. 2d, The mode of managing the sets. 3d, The quantity of seed per acre. 4th, Whether it is most adviseable to plant the entire potatoe or cuttings. 5th, Whether the use of shoots or sprouts is expedient. 6th, On raising new varieties; and 7th, The advantages of a change of seed."

It is here recommended that the large "*but not overgrown potatoes*," should be used, and that the cuttings should weigh about two ounces. Small potatoes or small cuttings, do not produce well. Mr. Knight, President of the London Horticultural Society, recommends that the cutting should always be large for an early crop, because they afford very strong plants, and soon recover from the effects of frost, and being abundantly supplied with nourishment by the large set, under ground, a new production of stems and foliage is produced, whenever the first is destroyed by the frost or other cause,—for late crops small sets will answer, as they do not form the tubers until they have attained some size. An account of an experiment is given in a note, in which whole potatoes were planted. "By this experiment it was found not only that the stems of the largest seeds were by far the strongest, but their produce was also by far the greatest, none of them producing potatoes larger than their respective seed." Our author states

that in Lancashire, where the potatoe is grown in the greatest perfection they reject both of the ends and plant only the middle, entire. We have seen various communications on the relative value of the different portions of the potatoe used for seed. They all concur in recommending the top part of the potatoe, as producing the earliest crop, and "A Denbighshire Gardener," states in the Gardeners' Magazine, that these top sets will produce tubers fit for the table a fortnight earlier than the bottom or root part. The whole of the communication is extremely interesting to those who wish to have an early crop, and we refer our readers to it* for further information.

2. In managing the set considerable attention is paid. In Lancashire the following is the most approved method:

"When the sets are cut, they are put on a room-floor, where a strong current of air can be introduced at pleasure, two lays in depth, and covered two inches thick, with chaff, or saw-dust. If desired to be very early, they remain thus from November till March; much attention being paid to give or to exclude air, according to the weather.

If the seed, after being cut, is suffered to lie in a heap, *it will heat*, and it will either be totally destroyed, or at least so weakened, as to produce *curled stalks*, and a poor crop.

* * * * *

There is reason to believe, that a set will not sprout until the cut be healed; and therefore, if the cutting be performed long enough before the setting, to allow time for the cut to heal or dry, so much time will be gained by the planter; which is a great object, especially to the poor, who are late in planting."

3. Twenty bushels of seed is recommended for the acre, which is said to be quite enough.

4. Whether the whole or cut potatoes should be planted is still a very disputed point, and there is nothing to be found here tending to settle the question.

5. The *shoots* or *sprouts* of potatoes, may be planted with considerable success, but is certainly to be recommended only in those cases where they have been detached accidentally from the potatoe, or where there is a deficiency of seed.

"Sprouts are fit for planting at any time after they acquire roots sufficient to support themselves, independent of the mother potatoes, which they generally do, when about three inches long.

* See Vol. i, page 225 of this Journal.

Sprouts may be planted successfully in all the various methods by which potatoes are usually planted; but it is not adviseable to have the sprouts *cut in pieces.* It is better to plant them whole, be they ever so long, or have ever so many series of roots and joints. When left whole they may be planted at greater distance. They answer best when laid *horizontally*, covering them in every instance as potatoe-sets are treated.

It is said, that potatoes, and the sprouts of potatoes, have been planted on the *same day*, and that sprouts came up about three weeks *sooner* than the potatoes. It is likewise maintained that sprouts will produce as good, if not better crops, than potatoe-sets, and more seldom fail of growing. So that this branch of the subject still requires additional investigation."

6. New varieties are readily raised from seed, and it is by this method that the very excellent kinds have been lately introduced. Our author mentions a farmer who had at one time one hundred and five varieties, but this is excelled by Mr. Tidd, of Massachusetts, who gives a very interesting account of an experiment made by him for the purpose of obtaining new varieties from seed. In this account he states that he had then of all colours "from black to white, besides a great number that were variegated, and of all sizes, from that of a pea to a full grown potatoe, and of all forms from a round to a long red, including some handsome ovals, and in all numbers from one to several hundred in a hill, if I may be allowed the term."‡ It being the first year, and the potatoe requiring two years to perfect itself from seed, he could not speak of their qualities, but he supposes that he has fifteen hundred kinds differing somewhat from each other.

7. A change of seed is strongly recommended by our author, and it is stated that "in Lancashire they are particularly attentive to a frequent total change of seed."

Our author makes mention of six modes of cultivating the potatoe. "1. The lazy-bed method; 2. Drilling; 3. Dibbling; 4. By the hoe; 5. In hillocks; and 6. Transplanting."

The *lazy-bed* method is to make a bed from five to ten feet wide, on which the manure is spread, and the potatoes planted, being covered by earth taken from the trench each side of the beds. Our author states it to be general in Ireland and "well adapted for damp soils and wet climates," from what we have learned from other writers we do not think that this method can ever be advantageously adopted.

‡ Vide New England Farmer, Vol. vii, p. 232.

Drilling is preferred to all the other methods of planting.

" If the saving in seed, manure, and labour, together with the improvement of the soil, be taken into consideration, in aid of the actual value of the crop, there is certainly no method that can stand in competition with the drill-culture.

The land for drilled potatoes should be dry, and clear of all impediments to the working of the plough. If the land inclines one way much more than another, the drills should run up and down hill, otherwise they cannot be effectually moulded on both sides by the hoe-plough ; but if the ground be flat, or not inclining much, then the drill should run north and south. The drills are usually about three feet asunder; but an intelligent farmer in Mid-Lothian, strongly recommends a greater space between the rows, having found, by experience, the advantage of four feet, not only in respect of the quality and quantity of produce, but also the improvement of the soil for the succeeding crops, in consequence of the soil being entirely shaded from the sun, by the luxuriance of the foliage.

Mr. Hassal sets his drills four feet apart, instead of three, and always found the former more productive than the latter.

The mode of ploughing, and putting in the dung in the furrows, are too well known to require any description in this place. The sets are planted from six to twelve inches asunder, a medium of about nine or ten inches to be preferred.

It is not necessary to cover the drills with mould, until the entire sowing be completed. A light harrow, somewhat raised by being bushed, (so as to prevent the harrow-pins from reaching the dung, which it would otherwise drag out of the drills,) drawn across the drills, will effectually cover them, much better, indeed, than the usual method of doing it by the plough, and then harrowing to level them. When the sets are covered with the plough, it leaves the ground uneven ; the potatoes in consequence come up, *not in regular rows*, but sometimes on one and sometimes on the other side of the ridge formed by the plough : a great inconvenience in horse-hoeing, besides the expense. But if the whole surface is laid quite level, (as above directed) the shoots will form a perfect row, as if transplanted by a line. *Horse-hoeing* cannot be performed effectually, unless the rows *are even.*

The horse-hoeing, by which is meant the throwing up mould out of the intervals to the plants in the drill, should be performed at least four times ; each time going and returning in the same interval ; that is, once from and three times to the plants: but the oftener they are horse-hoed the better, unless the planting is very late; then horse-hoeing keeps the potatoes too long in a growing state, and there is not then time for them to ripen fully. At the same time, potatoes have been horse-hoed, when in full blossom, without receiving any injury."

On account of the tediousness of *dibbling*, it can never come into general use, even if there was no other objection, but it appears, that although some crops raised by this method, were very great, yet that when the experiment was instituted between it and the drilling with the hoe, the advantage was in favour of the latter.

"The plan of dibbling potatoes is generally practised by the greatest planters perhaps in the kingdom, (those of Essex) by whom London is chiefly supplied. Great attention is due to a mode preferred by such men, whose scale of practice is so great. Their crops, however, are not found, (the vast advantage of London dung considered,) to rise into such superiority, as to allow conclusions favourable to that practice. It appears indeed from the following experiment, that drilling with the hoe is preferable to dibbling. After both had been treated in the same manner in regard to manure, period of planting, &c. when taken up, there was not only about one quarter more of produce from the drilled crop than from the dibbled, but the potatoes were larger, and had the advantage of being nearly a month earlier, by which the ground was at liberty sooner for another crop. The reason of this great difference seems to be, that in drilling with a hoe, the earth is left in a fine pulverised state, and the potatoe set or cutting, is afterwards covered with similar earth; the roots consequently have very fine earth to strike into, and facility to expand. On the contrary, the hole made with a dibble or setting stick, which in general is either of iron, or shod with it, glazes the soil around it, hardens the earth or the sides into which the roots are to strike; and if much rain ensues soon afterwards, the hole will probably be filled with water.

The *planting by the hoe* is similar to that by the plough, the only difference being in the instrument used in covering them,—the plough is used in their after culture. The disputed question "whether sets should be placed above or under the dung," is here introduced; only one experiment is given.

"Mr. Whyn Baker, in Ireland, tried an experiment to ascertain that point, with much attention, and the produce was,

	lb.	*oz.*
Over the dung, - - - -	105	4
Under the dung, - - - -	84	3
The result,	21	1

which, in an acre, would make a most important difference.

It is considered to be injudicious to place the manure over the sets, for the roots run obliquely downward, and do not produce

fruit; it is the lateral shoots that bear. When the manure is under the sets, the roots pierce into it, and extract their food. A distinction, however, has been made; for it is the usual practice in Annandale, if the land be a light dry soil, to spread the dung *in the furrows above the plants;* but in a heavy soil, the potatoes *above the dung*, with a view of giving the roots more space to expand."

Planting in hillocks, does not appear to be common in Great Britain, and but little is said respecting it, owing seemingly to want of information. In New-England it is a very common practice, but we know not whether it be preferable to the drill culture.

In cases of failure, or where the sprouts come up too thick, they may be *transplanted.*

"This mode of cultivating potatoes has been practised with success. Young sprouts, about three inches high, were nipped off close to the ground, and planted, by way of experiment, in beds were onions had failed. They were taken up in October, and for size, quantity and quality, could not be surpassed. Might not this plan favour the culture of early potatoes, for they might be raised under shelter, and transplanted when the weather became favourable?"

(To be continued.)

Art. II.—*Peach Trees.*

Cultivation of the Peach Tree. Anonymous. Trenton Federalist.

The writer of this piece, in 1820 set out an orchard of peach trees, which "throve admirably for five or six years, and in the interim had borne two beautiful crops of fruit—the last seeming to have completely exhausted it." It occurred to him that it was necessary to reinvigorate the tree, but he was at a loss in what manner to do so; to apply barn-yard manure he considered injurious. Another year passed on, and his trees became worse—"The roots were replete with worms, and in many instances they had completely girdled the principal ones." It has been the prevailing opinion that the premature decay and death of the peach tree is occasioned by this insect, but this is not his belief. He believes that they never caused the decline of a single tree, and that they only attack such as are exhausted, and thus fitted for their depredations.

"For the first three years, I could not in my whole orchard find a single worm: after that and when it began to bear, and consequently to diminish in vigour, I found a few, and even these were languid and scarcely able to stir, owing to the yet too strong gallic acid of the roots, but after it had borne the second year, they increased beyond all proportion: Now I think that sufficiently proves that the decline is owing in a great measure to lack of nourishment, and not, as many believe, to encroachment of the worm—they merely eat as it were, the diseased carcass of the tree."

This is certainly at variance with what has been hitherto considered as the cause, and it is important that the truth of this should be ascertained. The plan which he adopted afterwards with success, is thus given by him.

"I will now state, which I believe the best plan yet adopted, what answers an exceedingly good purpose to sustain that nourishment, and give the trees power to repel the vain efforts of the fruit to check them. I had almost despaired of my orchard after the two crops, thinking it too far gone to derive any benefit from all I could do, when by an accident, with which I will not trouble the reader, I had my whole orchard the next year in a perfect state of the most vigorous foliage, it was produced by a composition of oyster shell lime and tan, equally proportioned, and about half a bushel to a tree, put immediately round the trunk, a few inches under ground. It has been four years since I began to serve mine in this manner, and I had each of those years a fine crop, and they look as thrifty as they did when only three years old."

Art. III.—*Sweet Potatoes.*

1. *Method of raising Sweet Potatoes in a Northern climate; by* Calvin Morrell (of Ohio.) New England Farmer.
2. *On the Culture of the Sweet Potatoe, as practised in the neighbourhood of New-York; by* B. W. Strong. Gardener's Magazine.

Although the Sweet Potatoe can never be so extensively cultivated in the Northern states, as to answer the various purposes for which it is required, with us, yet as it has not more obstacles to encounter there, than the Irish potatoe has in the Southern states, it certainly may be cultivated to a much greater extent, and we believe that it has been more owing to a want of proper information, than any other cause, that its culture there is so limited as it is at present. Of late more attention has been bestowed on its culture, and we have noticed several pieces relative to it. The first Article which we have selected, recommends that the seed potatoes should be first sprouted on a hot-bed, from which place they are to be taken when the plants, (sprouts) are four or five inches high: The ground is made "perfectly mellow" and laid off

into four feet squares, by the plough. Wherever the furroughs intersect each other, a shovel full of fresh stable manure is placed, and over these, hills are made. The following are the directions for planting:

"Now take your potatoes out of the bed, and on examining them you will find a sprout coming from the eye, and a little above, several coming from the first, all with small roots. Three of these plants are sufficient for a hill. I have planted twenty-nine hills from a single potatoe, which produced a good yield in the fall season. After cutting off all the sprouts, plant your potatoes as before, and they will, after this, send forth many good shoots. Set your plants deep in the hill, nearly down to the manure. This manure not only furnishes nutriment for your plants, but will determine the length of the potatoes, which will be from the top of the ground to the manure. This is an important consideration in raising this species of potatoe. Many kinds of the sweet potatoe are inclined to grow long and slim, but by the method which I have laid down and followed for many years myself, any person with a little experience may raise these roots to any given length, by leaving the earth at his last hoeing as deep over the manure as he chooses to have his potatoes long."

Nothing is said of the after culture, and the remainder of the article is occupied with directions for preserving the seed, which are not applicable to our climate.

The directions given in the *second article* resemble very much the practice adopted by some of our planters for procuring a crop from *sprouts*, except that a hot-bed is here recommended, which we do not need.

"Towards the end of April, make a hot-bed of horse manure, about eighteen inches thick; on the manure put three inches of earth: on this earth plant the seed potatoes three inches apart, and cover them four inches deep with earth; when the sprouts they send up are three inches above the ground, draw them out with the hand, and transplant them (as you would cabbage plants) in soft, warm, rich ground in rows, four feet apart, and put the plants about one foot apart in the rows; keep them clear of weeds until the vines begin to cover the ground, after which their leafy nature will enable them to smother all weeds. If the hot-bed be made early in April, the early sprouts will be ready for transplanting by the 10th of May: the bed will continue to throw up a second and third succession of sprouts, all of which will afford good potatoes, if planted out any time before the end of June."

In a note to this article, the conductor of the Gardener's Magazine, gives an account of the method of cultivating them in France:

"The tubers are planted in February, or earlier or later at pleasure, in the pine stove, or in a small hot-bed; and the shoots they produce are taken off, and planted a foot apart every way, on dung beds, covered with fifteen inches of earth, and protected by hoops and mats in the manner of rigid cucumbers. This may be done any time from April to June, and the shoots are not dibbled in, but laid down in drills about three inches deep, keeping two inches of the point of the shoot above the earth. In about two months after transplanting, some of the tubers will be fit to take off for use, and the plants will continue producing till they are destroyed by frost."

Our farmers who planted this root for the supply of our markets, usually sustain a great loss in digging them early, inasmuch as but few have arrived at a size sufficiently large for the table, at that period. The adopting of the plan of removing only the large potatoes, and permitting those of a smaller size to remain, might be advantageously adopted by them. To effect this, perhaps it would be best at first to remove the earth only on one side of the bed ; select such as may be large enough, and immediately return it with the plough or hoe ; this course will leave all the roots on the other side uninjured to support the plant, until those which have been mutilated or in any way injured, have shot out fibres. After having gone over the whole field in this manner, the cultivator might return to the bed from which he started, and commence operations on the other side, leaving at this time that side untouched, which he had previously examined. How long this course may be continued, experiments alone can decide. It is, however, probable, that the beds might be gone over several times, as roots are readily emitted from almost every part of the plant.

SELECTIONS.

ART. I.—*Observations on the manner of Manufacturing Indigo in the Southern Provinces of India ; with some remarks on its Chemical Changes and Combinations.* *By* CHARLES H. WESTON, Esq.

[FROM THE QUARTERLY JOURNAL.]

(Continued from page 50.)

WE now return to the cultivation of the plant, and view it as gradually advancing to maturity. As it approaches this period, the colour of the leaves changes from a light to a dark green—yet this change is not gradual, but is quickly acquired a short time before the branches are fit to be cut. Much judgment on this point is required, for the evils arising from premature cutting are great, and much of the good effects of antecedently seasonable weather would be neutralized by such a mistake. The consequences are, a deficiency of produce, and an unequal absorption of oxygen in the beating vat. When the plant is fully matured, the branches are severed from the parent stem early in the morning, and spread

out in the sun till the afternoon. By this time they are so desiccated, that the leaves are easily separated from the branches, by simply beating them with a stick. The leaves, so separated, are housed in warehouses, closely packed, and well trodden down by natives.

The importance of *properly drying* the leaves, will be easily understood, when we learn that the leaves are not immediately used, but are kept so packed for one month. Moisture very soon produces fermentation, involving either a partial or total destruction of the colouring matter. Deficiency of produce, is, of course, the natural result of such change, and where no such bad effects have been felt, the use of *ill-dried*, or green leaves, produces an effect in the beating vat, similar to that which is consequential on premature cutting.

The leaves, however, when properly dried, do not remain for one month without suffering a very *material change*, and accomplishing a very important object. We find, at the expiration of this period, that the colour of the leaves has passed into a *light lead colour;* by additional keeping the lead colour gradually darkens until it becomes black. Experience has found that the leaves will not give out any colouring matter to cold water, until the first change has commenced to take place—that the maximum quantity of indigo is to be obtained when the lead colour is effected, and that, from this period, a loss in the quantity of indigo always accompanies, and is in proportion to the extent of such further changes. But, perhaps, the *necessity* of keeping the leaves, and the *nature* of the important change so accomplished during that period, will be better proved and elucidated by a perusal of some memoranda of a few experiments I made in India.

No. 1. " Digested some *green* indigo leaves from the plant, fit for immediate cutting, in *cold* water, for twenty-five minutes ;—the slightest *yellowish* extract, only, was produced.

2. " *Green* mango, and other leaves, digested in cold water for two hours, gave no extract.

3. " *Green* mango, and other leaves, *boiled* for an hour and a quarter, gave a clear reddish brandy colour to the water, and the leaves of a creeping plant similarly steeped, produced a yellow tinged with green, not clear, but leaving a sediment.

4. " Boiled the *green* indigo leaves taken from a plant fit for *immediate* cutting, for two hours and ten minutes. The liquor was decidedly a *greenish* yellow. This left on the filter the *smallest* quantity of indigo, and the solution, after twenty-four hours, became darker, and a little more indigo was precipitated. Both precipitates, however, most inconsiderable.

5. " Green solution of indigo in cold water, prepared from the *dried* leaves taken from the heap which had been one month in the warehouse, was kept in rapid ebullition for one hour, and water was added to supply the loss by evaporation ;—the *whole* of the indigo was precipitated, and the supernatant liquor was of a clear dark morone colour.*
6. " Indigo leaves, taken from the ripe plant (part of which was used in experiment No. 1,) after *ten days' keeping*, gave to the *cold* water, in which they were digested for twenty-five minutes, a fine *grass green colour.*
7. " Mango, and other leaves, well *dried* and *kept* spread out on paper for ten days, gave to *cold* water a deep brandy colour.
8. " *Boiled* for a short time, some *green* leaves taken from the ripe indigo plant, and obtained, by filtration, a brandy colour solution with a greenish tinge : half part of which (No. 1,) was exposed to the air, and the other half (No. 2,) was poured back over the leaves equally exposed to the air : No. 1 remained unchanged, and, when boiled, became only a darker brown, and gave no precipitation of indigo : No. 2, subsequently *fermented*, and *afterwards* became a good green.
9. " Green leaves, digested in *cold* water for one quarter of an hour, filtered, and kept exposed to the action of the atmosphere for fourteen hours, remained *unchanged.*

Cold water, allowed to *remain on the leaves* for fourteen hours, became green."

Now, the legitimate inferences to be deduced from these experiments, I conceive to be these :—

1. That as the green leaves of plants give no colour, and the leaves of the indigo plant no blue colouring matter to water by simple infusion, (Exp. 1 and 2) and the same leaves, after desiccation, and exposure to the atmosphere for many days, will, under the same circumstances, give out what is essentially the colouring matter of the leaves (Exp. 5, 6, and 7,) the warehousing the indigo leaves for procuring indigo by the dry process is *necessary.*
2. That the blue principle does *not* exist in the leaves *ready formed*, or in a state of separation, (Exp. 8 and 9,) but requires some new arrangement of its component parts to effect such separation ;—and,
3. That the *absorption of oxygen* is necessary either to produce such new arrangements, or to complete some incipient arrangement of its constituent parts (Exp. 4, 5 ; No. 2 of 8 and 9,) and, so to separate the blue extract, as to make it soluble in water, and, therefore, the *change* effected by one month's keeping, seems occasioned by an *absorption of oxygen.*

* The effects of boiling upon this supernatant liquor will be mentioned hereafter.

With such a view of the important changes which thus occur, we see that, chemically speaking, there is no such difference in the two processes as we might be led to imagine from the varied manner of *manufacturing* the indigo. The silent and gradual change which passes upon the dried leaves in the storehouse, is precisely analogous to the absorption of oxygen which precedes, and, in this instance, continues to be simultaneous with fermentation.* It might be further remarked, that the injury, arising from keeping the leaves after the acquirement of the "lead colour," to which I have before alluded, has its parallel in the injury sustained by excessive fermentation in the Bengal process. The period, during which the leaves are kept, appears, indeed, to be the only time in which the leaves could have received oxygen to *such an extent:* because, during the growth, as long as the sun's rays are exerting their direct influence upon them, they copiously give out oxygen gas, and, during the absence of the sun, the exhalation of carbonic acid gas, necessarily employs another portion of oxygen.†

Before quitting this part of the process, I will here state another experiment on the solution of *green* leaves in cold water, because, while it at first appeared completely to upset the conclusions I had deduced from former experiments, it did, upon subsequent consideration and examination, strongly confirm the truth of them.

Green leaves steeped in *cold* water for fifteen minutes began to tinge the water with a *greenish* yellow. Leaves from tho same plant, after five hour's boiling (the loss of water by evaporation being constantly supplied,) gave out a proper extract of indigo; and from another portion of leaves, after twenty-four hours' digestion in *cold* water, the *whole* of the indigo was precipitated, and the supernatant liquor clear, and of a good "brandy colour." These were unexpected results, and they seemed to throw a doubt over the conse-

* Although vinous fermentation can be carried on completely excluded from the atmospheric air (*Vide* Brande's 'Manual of Chemistry,' vol. iii.) this does not seem to be the fact in the present case of common fermentation, or partial decomposition. Dr. Bancroft, in his first vol. p. 185, writes—"But it was fully ascertained by Dr. Roxburgh, that a copious *absorption* of air from the atmosphere did occur; and that oxygen did combine with the basis of indigo in a considerable degree *during* fermentation, was manifested by the progressive changes which, as usual, constantly took place in the colour of the liquor during the fermentation until it acquired a full green, and even a bluish colour, the froth, or scum, becoming, more or less, blue at the same time. See, also, p. 176.

† I have qualified this remark by adding, "to such an extent," because it is not intended to intimate that either during the day or night the balance of oxygen is not *in favour* of the plant. The contrary, in both cases, is clearly proved by the experiments of Saussure, as mentioned in Thomson's 'System of Chemistry.'

quences of every one of the former experiments: my first inquiries and examination were, therefore, directed to the plants from which the leaves had been taken. I found the plant had been cut *one month* previously, and that the leaves were some few under leaves remaining on each plant of the *former* crop. Now, as the leaves had become ripe one month before, they had arrived at, and passed, the maximum capabilities of their physical powers; and their organs had long ceased to perform their proper functions in decomposing carbonic acid, and of exhaling oxygen gas. We know that fruit, when ripening, absorbs oxygen,* although allowed to remain on the tree, and the same tendency doubtless exists in the whole vegetable world in a greater or less degree. The leaves subjected to the above experiment had assumed a much darker green than leaves possess at the proper time for cutting, and as they had passed beyond the full period of strength and health, they could have no other tendency but to absorb oxygen.† They had then, consequently, been undergoing, for at least three weeks, the same process, though perhaps in a less degree, which the leaves in the warehouse had experienced, and had absorbed on the plant, that given quantity of oxygen which is necessary to render the colouring matter of the leaves soluble in water. Such a view of the subject reconciles all apparent difficulties.

The difference in the effects of ebullition upon the green leaves, in Experiment No. 4, and upon these in the last experiment, in reference to extent, can be easily explained, on the supposition of a previous absorption of oxygen; since, within certain limits, matter has its affinity for oxygen increased in a kind of geometrical ratio by the previous absorption of oxygen.

From this last experiment we get possession of this important fact, that in practice, the age of the plant, and the time for keeping it, should always be in an inverse ratio; that is, *if from fear of rain the plant be cut too soon, the leaves should be kept a little longer; and if from want of sufficient sunshine the cuttlng be deferred till after the plant is fully ripe, the leaves will not require to be kept so long.*

We now suppose the indigo leaves, after their due keeping, ready to be transferred to the "steeping vat,"‡ where

* M. Berard of Montpellier has showed that fruits, in ripening, convert the oxygen of the air into carbonic acid.—Davy's *Agricul. Chem.* See, also, Dr. Smith's *Botany*, p. 155.

† *Vide* Sir H. Davy's *Agricul. Chem.* p. 207—209.

‡ A vat is an uncovered reservoir, built of brick, and lined with stucco prepared from burned shells; it is usually about thirty feet square, and twenty-six inches deep.

they are commixed with water, in the proportion of about one volume of leaves to six of water, and allowed to remain for two hours. The great affinity of indigo for oxygen is here very manifest, in the quick change of the colour of the leaves which float on the surface, and are exposed to the action of the atmosphere, to a blackish blue, when contrasted with those below which remain unchanged. On this account the vat is, every now and then, "turned," that is, the floating leaves are immersed. This steeping part of the manufacture constitutes the characteristic difference between the green and the dry process. In this instance, it is a simple *infusion* of the leaves without fermentation; in Bengal, the branches, together with the leaves, are steeped and allowed to *ferment.*

After two hours' infusion, the water, which, from the solution of imperfectly-oxygenized indigo, has acquired a fine green colour, is allowed to run off from the leaves through strainers into the "beating vat." Two hours are generally supposed to be sufficient to extract all the colouring from the leaves, and the following experiment seems to confirm this supposition.*

"Refuse leaves of indigo taken from the vat, and quickly rinsed, to remove any indigo externally adhering to them, were digested in cold water for one additional hour. They gave to the water a pinkish colour, but no *green* tinge, from which was obtained, by a solution of acetate of lead, a delicate whitish yellow precipitate." My observations, of course, refer to leaves properly kept and properly dried; because, if prematurely put into the vat, the time necessary for the entire extraction of the indigo would be much greater. But the green liquor cannot be allowed to remain so long upon the leaves, because a partial precipitation of indigo would take place before it passed into the beating vat.

In the beating vat the solution is agitated by the paddles of ten or twelve natives for about two hours, during which time the fine green liquor gradually darkens to a blackish blue. No precise time can be laid down for the continuance of this part of the process, as the absorption of oxygen, which is thus effected, and hastened by beating, and the consequent continual exposure of some new portions of the liquor to the atmosphere, depends on circumstances, such as the former

* Whatever may be the necessity of making use of *hot* water for obtaining indigo from the leaves of the nerium tinctorium, or the advantages to be derived from its use in the fermentation of the indigofera tinctoria, which Dr. Roxburgh mentions, no possible advantage can be derivable from such management in the dry process; because, as we find that the solvent power of cold water is quite sufficient to extract the whole of the blue colouring matter, an increase of that power, by the addition of caloric, could only have the effect of dissolving other substances which are foreign to the dye.

preparation of the leaf, and the immediate influence of the sun.*

The only criterions to guide us, are—the peculiar black hue of the liquid, the whiteness of the froth thrown up by beating,† and the incipient separation of the particles of the indigo. This last effect can be easily seen by placing a small quantity in the palm of the hand, and more distinctly by pouring some into a white plate.

At this time lime-water is thrown into the vat, and well immixed with the liquor. The whole is then allowed to rest for three hours, and the supernatant liquor, which is, or ought to be, of a fine bright Madeira colour, is allowed to run away from the precipitate, by cocks placed at different heights. The indigo is then removed from the vat to the covered part of the manufactory called the larboratory, where it is put on a strained cloth, and allowed to drain throughout the night.

But as the beating process is the most material part of it, so it is here that we most sensibly feel any improper management with regard to the leaves. Premature cutting of the plant, imperfect desiccation of the leaves, and even the previous occurrence of much cloudy weather, while the plant was growing—show their bad effects in the necessity of a much more lengthened beating, and in imparting to the froth a green colour, which, otherwise, as the oxygen was absorbed, would, by a precipitation of the indigo, have become white. When the two first evils are to a greater extent, no beating will precipitate all the indigo, and, consequently, much will be lost. The supernatant liquor, instead of being a fine Madeira colour, will remain a dark, dingy Madeira colour.‡ The following experiments will give force to this observation:—

"A quantity of Madeira colour liquor left after the manufacturing of indigo improperly dried, was reduced by boiling to one-third its bulk. The colour was deepened, and the smell of it highly saccharine, and *blackish indigo was precipitated.* At this time the yellow extract of the liquor appeared to begin to separate. The liquor, after the removal of the precipitated indigo, was boiled for other seven hours, supplying the loss occasioned by evaporation: *more indigo* was precipitated, combined with some of the extract."

Again, "Another portion of the Madeira colour liquor was first exposed to the action of the atmosphere for seventeen

* It has been before remarked, that the vats are uncovered, and therefore exposed to the direct rays of the sun.

† This must be regarded with some limitation, as we shall see soon what will prevent sometimes the whitening of the froth.

‡ Dr. Bancroft confirms this remark.

hours, and then beaten for two hours. The solution became greenish by the additional absorption of oxygen, and a *little indigo* was precipitated."

As, therefore, the quantity of the precipitation depends upon, and is in proportion to, the oxygenation of the indigo, the importance of carrying on this beating process to its maximum to obtain the whole colouring matter is evident; but there is another extreme to be avoided.

When indigo is combined with a certain quantity of oxygen, its colourless base acquires a blue colour; but after this point is passed, and a further combination of oxygen has taken place, the colouring matter passes from a blue to a blackish-hue, and the indigo is technically said to be "burnt." If beating be carried on still further, the granulated indigo becomes specifically lighter, and a partial resolution of it follows, and it is therefore unavoidably lost. Each of the different effects here mentioned, will be more clearly pointed out and understood, by perusing the following memorandum:

"A green solution of indigo from the vat was agitated for ten hours. The supernatant liquor, instead of being a fine clear Madeira colour, became like burnt umber—resulting from a partial resolution of the indigo. The indigo became specifically lighter, and remained floating in the menstruum. The whole was filtered, and the indigo properly pressed and dried, and the cake when broken was *black*."

Beating, strictly speaking, is not essentially necessary to the formation of indigo, but is rendered expedient by the *accumulation* of the green solution in one place, and the consequent non-exposure of a great part of it from the influence of the oxygen of the air.* I make this remark, because I have found that portions of the green liquor could be *completely* oxygenised by bear exposure to the atmosphere, without agitation. "Made a solution with indigo leaves, filtered it, and divided it into two equal parts, one part of which (No. 1.) was exposed to the direct influence of the sun's rays, and the other (No. 2) was kept in a dark place. The first portion was considerably in advance of the other throughout the process, so that when No. 1, in two hours and a half, was completely precipitated, leaving the supernatant liquor a fine clear Madeira colour, No. 2, in the same time, was but partially precipitated, and the supernatant liquor remained greenish.

* This remark will serve to render evident the expediency of precipitates, although, as we shall soon see, they be not necessary in the small way. Dr. Roxburgh well describes their utility, when he says:—"If well chosen, and in proper portions, they forward the operation *much*, causing a *larger* produce than could be had without them." His advice as to the time for using them, is worthy some attention.

After long exposure, however, the whole indigo of No. 2 was also precipitated."

By this experiment, we learn, not only that a complete precipitation can take place without beating, but without the assistance of lime-water. We also learn that sunshine can hasten the beating process, as I before remarked; the great affinity of indigo for oxygen enabling it to separate and combine with that gas, which always co-exists with the least refrangible rays of light.*

(To be continued.)

Art. II.—*Propagation of Silk Worms.*

[FROM THE AMERICAN FARMER.]

"St. Charles, July 4, 1828.

Dear Sir,—I have had the pleasure to receive your recent letter, and will answer the queries it contains. I embrace the first leisure hour I have had since I received it, which happens to be the day on which we celebrate our independence. While others are rejoicing for the independence already gained, I will with greater pleasure attempt to aid you in your endeavor to show, that we ought to be, and can easily become more independent, by throwing off our dependence on other countries for silk and silken goods. Before I commence my answers, I will inform you that my silk raising has been mostly experimental. I commenced these experiments, to ascertain whether there was a probability that the silk raising business would be sufficiently profitable to justify going to the expense of making a large mulberry orchard; and since I was convinced it would, I have continued these experiments for the better understanding of the business. I have raised one crop of silk worms, all hatched within three days, which made two hundred and thirty-one pounds of cocoons; and another crop which made seventy-three pounds. My other crops have been smaller. You will therefore understand some of my answers to your queries, as more properly stating what I have done, and am doing, *by way of experiment, and as what I intended to do on a larger scale, for profit*, as soon as my young mulberry trees will furnish a sufficiency of food.

Query first. How do you hatch your eggs, and manage your worms?

* *Vide* "Light and Caloric."—Thomson's *Syst. of Chem.* and Ure's *Chem. Dict.*

Answer. I hatch them without artificial heat. When the eggs are kept in a room where no fire is used, they will seldom hatch before the mulberry trees will furnish food. But I generally keep them in a cool place, until near the time I shall want young worms, when the eggs are placed in the feeding room, where they hatch within from five to ten days. The eggs are kept on the sheets of paper as they are laid by the moths. When the eggs begin to hatch, the sheets of paper are spread on tables or shelves, and young tender mulberry leaves are placed near the hatching worms. The worms attach themselves to these leaves as fast as they come out, and are carefully removed every evening to the feeding shelves. *I keep each day's hatching by itself, and never, at any stage of their existence, mix together on the same shelf worms of different ages.*

Q. 2 Do you feed on the wild black mulberry, or on the Italian white, or both?

A. I have fed my worms principally on our indigenous red mulberry, (a variety very common here, which bears black fruit,) but not so much by choice as out of necessity. I have but few white mulberry trees old enough to furnish food for silk worms; yet these few trees have enabled me to try several experiments, to ascertain which is most valuable. The result of these experiments has convinced me, that although the leaves of the white mulberry may not make the worms grow larger, they will fill their silk vessels fuller with the silk material, than our wild kind. This is shown by the fact, that worms fed on the white mulberry, shrink less before they begin to spin; and they spin larger cocoons, composed of a coarser and stronger fibre, with less gum than those worms which are fed on the wild mulberry. The silk made from our wild mulberry has often been admired for the fineness of its fibre; but this fineness with the gum attached to it, certainly renders it more difficult to reel, and, in my opinion, does not add to its value after it is reeled. I only mean to be understood to say, that I consider that there is an inconsiderable difference between the two kinds, and the white is entitled to the preference.

Q. 3. On what sized trees, and in what age, and state of the foliage, do you gather for your worms?

A. While the worms are young, I feed with the most tender leaves. These may be found most plentifully on young trees. They, however, may be procured from the fresh growing shoots of old trees. As the worms increase in age, I give them older leaves, or rather old and young gathered promiscuously, until after their last cast, when I aim to feed them wholly, if they can be conveniently procured, with full grown leaves, taken from trees of some age. As it regards the trees,

after they are three years old, they may be moderately picked without injury. Very close picking, and that frequently repeated, will check their growth; but when the growth of the tree is not an object, this may be repeated several times, during the same summer, and a new foliage will immediately succeed the loss of the old.

Q. 4. How do you manage your worms while in a state of feeding?

A. I keep the worms on shelves, or on light frames, three and a half feet square, filled with basket splits, and then covered with some kind of strong paper These are put up in form of shelves. I aim to give the worms at all times as much food as they will eat, and never give it in less than three meals, often in six or eight meals a day. I have the litter removed from them at least often enough to prevent its becoming mouldy or offensive. When the weather is warm, they have a free circulation of air.

I have sometimes set them to spinning on hedges, erected according to the French and Italian mode; but have found it more convenient to use oak bushes, having large leaves, and which should be cut three or four weeks before wanted, that the leaves may become dry and curled.

Q. 5. Is it known that the silk worm will feed on any thing beside the mulberry, so as to make cocoons?

A. It is said the silk worm will feed on the dandelion. I know it will feed on lettuce, when it cannot get better food. The knowledge of this fact is often useful to silk raisers. When mulberry leaves fail, by frost or otherwise, lettuce may be fed to young worms until mulberry leaves can be procured. Probably, there is no valuable substitute for the mulberry leaf, which is not much to be regretted, as few trees are more easily raised, and furnish leaves sooner, and more abundantly, than the mulberry.

(To be continued.)

PART III.

MISCELLANEOUS INTELLIGENCE.

Horticultural Societies have sprung up with amazing rapidity in some of the Northern and Eastern States, and are likely to prove of much benefit. There exists one in Philadelphia, three in the state of New-York, one in the city, and two in the interior; and one at Boston, besides several others, of which perhaps we have not been informed. The New York Horticultural Society, is the oldest by several years; but it appears to us from the accounts we receive, that the one at Boston promises to be one of the most active, as well as useful, of all these societies. They have been, we believe, but little more than one year in existence, and appear already to have produced considerable effect. The members are zealous, and judging from the reports made through the New England Farmer, the society must be in a flourishing condition. Presents of new trees, plants, fruit, vegetables, seeds, &c. are numerous, and we cannot but congratulate our friends of Boston, on their success. Why should we not have a Horticultural Society at Charleston, and another at Savannah How many new and valuable fruits and vegetables, might be introduced among us by their agency. Well conducted, such societies prove real blessings, both to the poor man, as well as to his more wealthy neighbour. We really wish that some of our enterprizing citizens would take it into their serious consideration, and do something towards establishing them In England they have become very popular, and have been productive of much good. In *one number alone* of the Gardener's Magazine, the proceedings of twenty-two Horticultural Societies are given. There are many others in the kingdom, and several on the continent.

Winter Melon —At one of the meetings of the Bury Horticultural society, a winter melon was presented, which "was considered a most valuable species, the flavor being very fine, and the fruit keeping as late as the month of February—the plant moreover being rather hardy than otherwise, and a free bearer. The form of the fruit is as near to the cucumber as to melons in general." This species would be an acquisition any where, and we regret that the name has not been given.

Raising Peas in France.—I do not recollect to have seen our method of cultivating early peas practised in England. The market-gardeners place their rows east and west, and raise a little ridge of earth on the north side of the row, which protects them from the north winds, and receives, at a more powerful angle, the sun's rays; by which more heat is reflected on the plants in the day-time, and at the same time more absorbed, to be radiated on them at night. When the plants show their second blossom, the top is pinched off, which throws the force of vegetation upon the forming pods, hastens the maturity of the crop, and increases the size of the peas. The operation is called *chatrer*. The crop is generally removed by the end of May, after which mangold wurzel is frequently sown; but sometimes rows of potatoes are planted between the rows of peas. Turnips round Paris are generally sown after winter barley, which is put in the ground early in autumn, and the crop cut green, for cows, in March, April,

and May. Madame la Comtesse de Bruce is dead, and her place and extensive collection of plants are now to be sold. Yours, sincerely,—*Thomas Blaikie.—Gardener's Magazine.*

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Melons.—A writer in the Richmond Enquirer, with the signature Agricultor, says, "I now from a small spot of poor ground, raise the greatest profusion of melons, whereas, until lately, I could not raise enough on four or five times the same space of rich land. I dig square holes ten feet apart, each way, for watermelons, and about six feet for muskmelons; for the first, two feet deep, for the last, eighteen inches deep, and eighteen inches wide. The roots run but a short distance in a horizontal direction, but striking deep into the earth, they are secure from the effects of drought; and by filling the holes half full of manure, and finishing them to a few inches above the surface with a mixture of manure and soil, or which is better, a composition of vegetables, and other substances, commonly to be met with around out houses and pig pens, a depth of soil, of fine and light tilth is formed. I have not attempted to raise pumpkins in this way, but have no doubt that it will answer for them."

The same plan may be adopted with advantage and economy, as to manure, in raising Lima beans, especially in cold situations.—*Penn. Agric. Almanack.*

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Transplanting Shrubs in full growth.—Dig a narrow trench round the plant, leaving its roots in the middle in an isolated ball of earth; fill the trench with plaster of Paris, which will become hard in a few minutes, and form a case to the ball and plant, which may be lifted and removed any where at pleasure. (*French paper.* Com. by *L. R—r.*)

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Summer made Manure.—Many cultivators waste nearly all the manure, which their cattle make in the summer time by mismanagement. Their cow-yard is large, and the droppings of their cattle are spread in thin layers over a large surface. Of course they are first dried through and through by the sun, and, secondly, washed away by the rains. Cattle should be yarded in summer, in a small space. Their manure, once or twice a week, at least, should either be ploughed in or mixed with soil, for compost—placed under cover—shovelled into heaps and covered with earth, or in some way secured against the robbery of the elements. A farmer would be thought crazy, who should expose his cattle-fodder to the weather for months, before he made use of it; and he cannot be in his right mind, if he suffers his manure, (which is the heart's-blood of agriculture) to be sucked up by the sun—drizzled away by the rain, or tossed about by the four winds of heaven.—*New-England Farmer.*

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American Silk.—We are happy to learn by a gentleman in Mansfield, (Con.) that the silk business in Connecticut was never more prosperous and profitable than it has been this season. There has been an immense demand for raw silk from New-York, to be fabricated into fringes and ribbons for ladies dresses; and one house in Norwich, (Con.) has offered to take all the raw silk that can be collected in the State, at a fair price. One or two silk looms have recently been started in Norwich.

The ladies of the little town of Mansfield, (Ct.) have realised the past year $25,000 from the manufactnre of silk. Such hints ought not to be lost upon those ladies who imagine gentility consists in doing nothing.—*N. E. Far.*

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Eggs throughout the year.—Few poultry yards can vie with that of Captain Dunn, of New-York, who has taken extraordinary pains with his breeds. With a view to their improvement he has even visited China, and collected races from all countries. The following are given as the results of his experience:—With regard to fowls he is convinced, that the cross

breeds issuing from the English race and the great sorts of Malacca, are the best to breed from. Water warmed for the use of ducklings and goslings is very conducive to their thriving. In order to make hens lay throughout the winter, it is recommended to mix with their food pounded oyster or other shells, and slate also pounded.—*Bull. Univ.*

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Separating Wax and Honey from the Comb.—The following interesting communication is extracted from a recent number of the *Mechanic's Magazine*:—Sir,—In a number of your Magazine, of 1816, (p. 223, Vol. VI.) I find an account of clearing the wax from the honeycomb; which being attended with more trouble than is requisite, I send you the following process: When your honey is cleared from the comb, put your wax into a coarse canvas bag along with some pebbles; tie the bag up close, and put it into a pot, or saucepan, filled up with water. Place the pot on the fire; let it boil for some hours; then take it from the fire and set it in a cold place. The next day you will find a fine even cake of wax floating on the water, free from all impurities. The reason for putting pebbles in the bag, is to keep it at the bottom of the pot; otherwise it would rise, and attach itself to the supernatant cake of wax. The water that remains contains a good deal of saccharine matter; and by adding more honey (as proportion requires) it may be used for making mead. The following is a good method of separating the honey from the comb:—When you cut out from an old hive, the honeycomb, put the same on flat dishes, or shallow wooden trays, made of lime or willow wood (as deal wood, and some others, might give an improper flavour to the honey,) and carry these trays into a room with closed windows, otherwise your bees will find them out, and give you much trouble and annoyance. Then, with a knife and fork cut from the comb the purest, which I shall call No. 1; put it into a pan, and cut it into small pieces; after this put the above into a coarse sieve (where the holes are about 1-14th part of an inch) and let it filter into a pan set under the seive. The remaining honeycomb which I shall call No. 2, must be treated in the same way as No. 1, but will give an inferior honey, in consequence of the comb containing a yellow matter, called bee-bread, which the honey dissolves, and derives from it a yellow colour and disagreeable taste. I have only to remark, that honey from young bees does not require the above assortment, being all white and pure: it is hence called virgin honey. J. B.—*St. Petersburgh, Russia, March* 5, 1827.

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Tea.—The cultivation of tea is not general throughout the Chinese empire, the northern parts being too cold, and the southern parts too warm. The plant is the growth of a particular region called the tea country, viz. Zok-yen, Ho-ping, An-koy, &c. There are some plantations near Canton, but they are few and not extensive. The trees are planted four or five feet asunder, have a very stunted appearance, and are not allowed to grow higher than is convenient for men, women and children to pick the leaves. The gatherings take place from one to four times in each year, according to the age of the plants. The difference in the times of gathering and manner of curing, causes the difference of appearance, qualities and value; the leaves which are gathered earliest in the spring make the strongest and most valuable tea, such as pekoe, souchong, &c.; the inferior, such as congou, bohea, are of the latest gatherings. Green or hyson can be made of any of the gatherings, by a different mode of drying. The first gathering of the leaves begins about the middle of April, and continues to the end of May; the second lasts from midsummer to the end of July; the third takes place in August and September. When the leaves are gathered they are put into wide shallow baskets, placed on shelves in the air or wind, or mild sunshine, from morning till noon: then on a flat cast iron pan, over a charcoal stove, ten or twelve ounces of the leaves are thrown at a time, stirred quickly with a short hand-broom twice or thrice, and then brushed off

again into the baskets, in which they are equally and carefully rubbed between men's hands to roll them; after which they are again put into the pan in larger quantities, over a slow fire, to be dried a second time. When fired enough, the tea is laid on tables, to be drawn or picked over, putting aside all the unsightly or imperfectly dried leaves, in order that the sample may be more even and marketable. To make singlo or hyson, the first two gatherings are chosen, and as soon as picked from the trees are put into the pan; next rolled, and spread thin to separate the leaves which adhere to each other; again well dried, spread, sifted, picked, and fired two or three times more, (especially if damp weather,) before it is in a warehouseable state.

The Chinese drink their tea without either milk or sugar; they partake of it plentifully at their meals, and very frequently in the course of the day. For the accommodation of Europeans at Canton, during the business season, milk is hawked about the streets as in towns in Europe, ready meted out in small unglazed earthen pipkins. The milk is drawn from large *breeding sows* kept for the purpose. It is sweeter than the milk of the cow, but few strangers can detect it, unless they are told what it is. Swine are sacred to the Chinese; and as they consider them one of the most valuable gifts of Providence, they, from a religious feeling of gratitude, always keep alive two or three enormous hogs in their places of worship, highly fed, and pampered with whatever they will eat, and kept extraordinarily clean by the priests. Our prize swine are shadows compared with them; they are fed by hand for years after they can neither stand, see, or hear. No idea can be formed of their monstrous shape and fatness. When they die, which at last they do from utter helplessness, another is immediately presented to the vacant stall, but how the defunct is disposed of is a secret. The Chinese breed and feed pigs well. Their pork is excellent; they either roast it, to be afterwards cut up and eaten as a stew, soon after it is slaughtered, or *champoed*, as they call it, that is, partly dressed, salted, and dried in the air; the warmth of the climate preventing its keeping long in a fresh state.

China is not an inclosed country, having no convenience of grazing except by the tether, and that but seldom seen. In the southern provinces there are but few horses and oxen, and fewer sheep. The more profitable live stock of fish, pigs, ducks, and geese, furnish their larders to eat with their rice, which serves them for bread; and numerous canals, which render beasts of draught, wheel carriages, high roads, and even hedges unnecessary, and at the same time yield esculent roots (the water lily) and fish in abundance, and moreover safe and easy conveyance from place to place, reconcile the Chinese nation to the want of costly horses, carriages, and all the other paraphernalia of European luxury.

As agriculturists and gardeners they are indefatigable; the ground intended for rice is broken up when it is very moist, by a very light plough of a peculiar construction, drawn by one or two small oxen. The plough acts like a colter, cutting off thin slices (not furrows) from the land to the work side of the field. Night soil is their favourite dress; public yards are formed in towns for its reception, and is afterwards sold in an unadulterated, unmixed state, at a high price. An European sees with astonishment the patient husbandman, with a pail in one hand, and a spatula in the other, smearing the surfaee of his field with this precious unction!—a task which would be disgusting to the rudest English peasant. Their delicacy is here sacrificed to the profitable effects of the application. Hence the fertility of their fine, rich, alluvial land, yielding sufficient supplies for the immense population, at a charge for cultivation of less than half the value of the produce. How different this from similar circumstances in England, where the cost of the crop but barely balances and often exceeds its value! This it is, viz. low wages, which enables the Chinese to supply the rest of the world with tea, cotton goods, porcelain, &c on such reasonable terms, and which also prevents the introduction of such manufactures anywhere else.—*Br. Farmer's Magazine.*